



FRIDAY, OCTOBER 29.

Association of American Railroad Superintendents.

We have received from the Secretary a condensed official report of the proceedings of this Association at the semi-annual meeting held in New York last week, which is given in full below:

The twelfth meeting of the Association of American Railroad Superintendents was held in New York on Thursday, Oct. 14, about 40 members being present.

Superintendent Ble, from the Committee on Frogs, made a verbal report, and presented letters and blue prints which were examined and discussed, after which the committee was enlarged by the addition of Superintendents Gadsden and Holbrook. The committee was requested to make a written report at the next meeting, also to inquire particularly into the advisability of substituting a spring-rail frog for the fixed frog now in use.

The Committee on Invitation to the Central Association reported that they had accomplished their mission and that the Central Association had disbanded and united with this Association. The report was accepted and approved, and the gentlemen who had composed the Central Association were declared members of this Association. The Committee was continued and requested to report at the next meeting such changes in the constitution and by-laws as will improve and enlarge the scope of the Association. The name of the Association was changed to the "Association of North American Railroad Superintendents."

A communication was received from the Yardmasters' Association relating to yard signals. After considerable discussion this subject was referred to a committee consisting of Messrs. Morford, Ble and Stark.

The by-laws were amended by adding to the duties of the Executive Committee the following:

"To appoint at each spring meeting in each year, standing committees consisting of three members each, upon Roadway, Machinery and Transportation. The Executive Committee subsequently reported that they had appointed the following committees to serve until the spring meeting:

On Roadway: Messrs. Shepard, Sanborn and Holbrook.

On Machinery: Messrs. Gadsden, Sully and Devine.

On Transportation: Messrs. Royer, Ewan and Thornburgh.

The following preamble and resolution were adopted:

"Whereas, Excessive delays in freight car service through dilatory action of consignors and consignees in loading and unloading has become a heavy burden and calls for some remedy, therefore

"Resolved, That a committee of five be appointed by the Chair, to consider the subject of freight-car demurrage, with view to improving the present methods, such committee to submit its report at the next meeting."

The Chair announced as the Committee Messrs. Palmer, Atwater, Chase, Bradley and Wade.

The Secretary was instructed to communicate with the several associations of Roadmasters, Master Mechanics and Master Car-Builders, and to invite these associations to forward the standard appliances recommended by them to this Association for consideration and adoption.

The Committee on Transportation were requested to consider the expediency of establishing a uniform rate per train-mile for trains using another line in emergencies, as in avoiding washouts and other obstructions, and also of fixing a maximum rate for passenger coaches loaned to other companies.

President Stevenson, at the request of a member, gave an account of the practical working of the Phelps system of telegraphing to a moving train.

It was ordered that 300 copies of the by-laws be printed.

The thanks of the Association were extended to the National Railway Publication Co. for use of the room for the meeting. The Association then adjourned.

General Time Convention. Committee Report on "Uniform General Rules and Telegraphic Orders."

To the President and Members of the General Time Convention:

GENTLEMEN: Your Committee on Uniform General Rules and Telegraphic Orders, appointed at the meeting held at the Grand Hotel, Cincinnati, O., April 14, 1886, begs leave to report that it has held sessions as follows:

At New York City on June 15, 16 and 17, 1886.

At Cleveland, O., on July 20, 21 and 22, 1886.

At Asheville, N. C., on Sept. 14, 15 and 16, 1886.

In addition to these meetings the Committee appointed by the former conventions held the following sessions:

At St. Louis, Mo., on April 8, 1885.

At Chicago, Ill., on Sept. 23 and 24, 1885.

At Pittsburgh, Pa., Oct. 27 and 28, 1885.

At Louisville, Ky., on Dec. 8 and 9, 1885.

At St. Louis, Mo., on Feb. 10, 11 and 12, 1886.

At Cincinnati, O., on April 14, 1883.

All of these meetings were fully attended by the members of the Committee.

In the preparation of the rules submitted, your Committee has adhered to the principle of securing both the highest degree of safety and the largest measure of efficiency. They believe the former has been accomplished in accordance with the most modern ideas and the best practice, without detriment to the latter; and that all roads have been left sufficient latitude to enable them to adapt the rules to their local circumstances, while strictly conforming to the general principles and practice as here laid down.

The attention of the convention is called to some slight changes which have been made in the Code of Signals, the reasons for which are given in the notes attached thereto. With the exception of the signals above referred to, your Committee has ascertained that the Uniform Code of Signals has been adopted by 86 per cent. of the roads reporting, representing 80,917 miles of road and 400 millions of annual train mileage.

The convention is aware, the members of your Committee represent railways extending through widely separated sections of the country. The Committee also found that its members held widely differing views as to methods of practice, representing as they did roads moving the heaviest tonnage and those with a light and comparatively easily handled traffic, with great diversity as regards grades, curvature and other physical and climatic conditions.

After each session of the Committee the work previously prepared was placed in type and submitted to various officials and employees of the transportation departments of lines differing in character and location; such criticism and suggestions being invited as would naturally occur to the class of officials and employees upon whom would devolve the practical execution of the rules. At the following sessions of the

Committee these criticisms and suggestions were carefully considered and acted upon. This course has necessarily made rapid progress by your Committee impossible.

The language of the rules is believed to be fully within the comprehension of any employé.

The Committee's work has also been submitted to the legal departments of several railway companies, and has been fully approved by them.

The investigations of your Committee have developed the fact that in many states railway commissions have undertaken to criticize and condemn many of the rules in force for the operation of railroads, even upon the best managed lines. The tendency of such commissions, as well as of state legislatures, is in the direction of formulating rules and regulations which shall conform to their ideas of railway management, however these may vary from the best judgment of experienced railway officers. Juries also are prone to construe to the detriment of railway interests any assumed weakness in running rules or telegraph instructions. The fact of the existing want of uniformity in rules has been frequently used before juries, to show that an accident upon one railway might have been prevented by the use of a rule in force upon some other railway, even though the rule in question has successfully borne the strain and stress of long-continued usage. This, with the growing tendency of railway commissions to condemn any practice to which they attribute the cause of an accident, and their frequent findings that the practice of some other railway or the adoption of some rule of their own formulation would in their opinion have prevented such an accident, often renders successful defense extremely difficult. These facts impressed upon your Committee the grave importance of the work undertaken.

Few of the members of the various railway commissions or of the state legislatures, no matter how well versed or expert they may be in other lines of business, have had any practical experience in the actual operation of railroads—a business which is as technical in its character as the practice of law or of medicine. The difficulties under which these public officials have labored under such circumstances can be readily appreciated. Your Committee believes that the adoption of a Uniform Code of Rules will do much to relieve railway commissions from the pressure to which, under the circumstances, they have heretofore perhaps unwillingly yielded.

Your Committee is strongly impressed with the importance of the adoption of absolutely uniform practice in regard to running rules and telegraph instructions, and herewith reports as the result of its labors a Code of Uniform General and Train Rules which meets with the unanimous approval of its members, and submits the same to the convention for its action.

Your Committee regrets exceedingly that it has been impossible to fully complete the "Rules for the Movement of Trains by Telegraphic Orders" in time to present them at this convention. Sufficient progress, however, has been made to enable a report on this branch of the subject to be prepared in time for presentation at the next meeting of the convention. The fact that these rules have not been completed need not prevent roads from at once putting the General and Train Rules in effect if adopted by the convention, as in the judgment of your Committee the "Rules for the Movement of Trains by Telegraphic Orders" should be issued in a separate volume.

Respectfully submitted,

K. H. WADE,
General Superintendent, W., St. L. & P. Ry.

E. B. THOMAS,
General Manager, Richmond & Danville System.

H. B. STONE,
General Manager, Chicago, Burlington & Quincy R.R.

H. WALTERS,
General Manager, Atlantic Coast Line.

J. T. HARAHAN,
General Manager, Louisville & Nashville R. R.

W. M. ROGERS,
Gen. Sup., Central & Southwestern R. Rs. of Georgia.

C. D. GORHAM,
Superintendent, West. Div., N. Y., C. & St. L. Ry.

R. PITCAIRN,
General Agent and Supt., Pittsburgh Div., Penna. R.R.

THE PROPOSED UNIFORM TRAIN RULES.

The following is the code of general and train rules approved at the meeting of the General Time Convention at New York, Oct. 13, 1886, to be finally acted upon at the meeting to be held in New York, April 13, 1887:

GENERAL NOTICE.

It is of the utmost importance that proper rules for the government of the employees of a railroad company should be literally and absolutely enforced, in order to make such rules efficient. If they cannot or ought not to be enforced, they ought not to exist. Officers or employees whose duty it may be to make or enforce rules, however temporary or unimportant they may seem, should keep this clearly in mind. If in the judgment of any one whose duty it is to enforce a rule, such rule cannot or ought not to be enforced, he should at once bring it to the attention of those in authority.

All employees should be required to be polite and considerate in their intercourse with the public. The reputation and prosperity of a company depend greatly upon the promptness with which its business is conducted and the manner in which its patrons are treated by its employees.

GENERAL RULES.

1. The Rules herein set forth apply to and govern all roads operated by the Co.

They shall take effect and supersede all prior rules and instructions, in whatsoever form issued, which are inconsistent therewith.

2. In addition to these rules, the time-tables will contain special instructions, as the same may be found necessary or desirable. Special instructions, whether in conflict with these rules or not, which may from time to time be given by proper authority, whether upon the time-tables or by written order, shall be fully observed while in force.

3. The head of each department should keep himself conversant with the rules, supply copies of them to his subordinates, see that they are understood, enforce obedience to them, and report to the proper officer all violations and the action taken thereon.

4. Every employee of this company whose duties are in any way prescribed by these rules must always have a copy of them in his possession when on duty, and must make himself perfectly acquainted with every rule. He must render all the assistance in his power in carrying them out, and immediately report any infringement of them to the head of his department. Safety depends upon the strict observance of every rule.

5. The fact that any one enters, or remains in, the service of the company will be considered as an expression of willingness to obey these rules. He will not be excused for the violation of any of them, though they may not be included among those applicable to his department.

6. If any one is in doubt as to the meaning of any rule or special instruction, application must be made at once to the

proper authority for an explanation. Ignorance cannot be accepted as an excuse for neglect of duty.

7. Employees of every grade will be considered in the line of promotion, their advancement depending upon the faithful discharge of their duties, and their capacity for assuming increased responsibilities.

8. If an employee should be disabled by sickness or other cause, the right to claim compensation will not be recognized. An allowance, if made, will be a gratuity justified by the circumstances of the case and the employee's previous good conduct.

9. Every employee, while on duty connected with the trains on any division of the road, shall be under the authority, and conform to the orders, of the Superintendent of that Division.

10. Employees must wear the prescribed badges or uniforms while on duty.

11. Mail agents, express messengers, parlor and sleeping car conductors and porters, news agents and persons in charge of individual cars are subject, while on duty, to the rules governing employees of the company.

STANDARD TIME.

12. Observatory Standard Time will be the only recognized standard, and will be transmitted from Observatory to the general offices.

13. The standard time will be telegraphed to all points from the general offices at 4 p.m., Central time, daily.

Note.—In order to detect possible errors at junction points and to secure uniformity, the Committee recommend that the time be disseminated to all points at the same hour. They consider it of great importance that the time be obtained from some observatory of recognized standing.

14. Certain clocks will be designated on each division as Standard Clocks.

15. Where station clocks are provided, station agents must see that they show correct time; but trainmen and engineers must not take time from such clocks unless they are also designated as Standard Clocks.

16. Each conductor and engineer must have a reliable watch which has been examined and certified to on the form attached hereto, by responsible watchmaker. Conductors and engineers entering service must file such certificates with the proper designated officer before they are allowed to take charge of trains or engines; and watches must be examined, and certificates renewed, every six months.

(Form of Certificate.)

WATCHMAKER'S CERTIFICATE.

This is to certify that on 188 the watch of employed as

on the R. has been examined and found to be a reliable and accurate time-piece, and in such repair as will, in my judgment, with proper usage, enable it to run within a variation not to exceed 30 seconds per week.

Name of maker

Brand

Number of movement

Gold or silver

Open or hunting case

Stem or key winding

Signed,

Watchmaker.

Address
[Note.—Where this system of examining watches has been adopted, the result of the examination has developed the fact that a large percentage of the watches previously in use were unfit to run train s by.]

17. Each conductor and engineer must regulate his watch by the designated Standard Clock before starting on each trip, and register his name and the time at which he regulated his watch on a blank form (or in a book) provided for that purpose.

18. Conductors and engineers whose duties prevent them from having access to a Standard Clock must compare daily with, and regulate their watches by, those of conductors and engineers who have Standard Time, and have registered their names as above provided.

TIME-TABLES.

19. A Time-table is the general law governing the arriving and leaving time of all regular trains at all stations. Time-tables for running trains will be issued from time to time, as may be necessary. The times given for each train on such Time-tables shall be known as the Schedule of such train.

20. Each Time-table, at the moment it takes effect, supercedes the preceding Time-table, and all special instructions relating thereto; the trains shall be run as directed thereby, subject to the rules of the company. All regular trains on the road running according to the preceding Time-table shall, unless otherwise directed, assume the times and rights of trains of corresponding numbers on the new Time-table.

21. Not more than two sets of figures will be shown for any train at any station or siding. Where but one time is shown upon the Time-table for a train at any station, that time shall be regarded as the leaving time. Where two times are shown the earlier (placed in its proper position) will be the time of arrival, and the later the time of departure.

22. Regular meeting or passing points will be shown on the Time-tables by printing the time in full-faced type.

In case a train meets or passes two or more trains at one point, the schedule of such train will show, in full-faced type, only its earliest and latest meeting or passing times.

In all cases trains are required to clear and follow as per Rules 87 to 92 inclusive.

[Note.—The Committee recommend that, where practicable, attention shall be called by their numbers to the trains met or passed in connection with and following the full-faced figures.]

23. On the employees' time-table the words "daily," "daily, except Sunday," etc., will be printed at the head and foot in connection with each train, to indicate how it shall be run. The figures given at intermediate stations shall not be taken as indicating that a train will stop unless the rules require it. The following signs placed before the figures indicate:

"s"—regular stop (or the same may be designated by the different styles of type used).

"f"—stop on signal to receive or discharge passengers or freight.

"—"—stop for meals.

Trains shall be designated by numbers, and their class indicated on the time-tables.

[Note.—The Committee recommends that odd numbers shall be given to West or South-bound trains, and even numbers to East or North-bound trains.]

SIGNAL RULES.

Signals.

24. Conductors, engineers, firemen, brakemen, station agents, telegraph operators, switchmen, switch-tenders, track foremen, road and bridge watchmen, and all other employees whose duties may require them to give signals, must provide themselves with the proper appliances, and keep them in good order and always ready for immediate use.

25. Flags of the proper color must be used by day, and lamps of the proper color by night or whenever from fog or other cause the day signals cannot be clearly seen.

26. Red signifies danger and is a signal to stop.

27. Green signifies caution and is a signal to go slowly.

28. White signifies safety, and is a signal to go on.

29. Green and white is a signal to be used to stop trains at flag stations for passengers or freight.

30. Blue is a signal to be used by car inspectors.

31. An explosive cap or torpedo, placed on the top of the rail, is a signal to be used in addition to the regular signals.

The explosion of one torpedo is a signal to stop immediately; the explosion of two torpedoes is a signal to reduce speed immediately, and look out for a danger signal.

32. A fusee is an extra danger signal, to be lighted and placed on the track at night, in cases of accident or emergency.

A train finding a fusee burning upon the track must come to a stop, and not proceed until it is burned out.

33. A flag or lamp swung across the track, a hat or any object waved violently by any person on the track, signifies danger, and is a signal to stop.

Train Signals.

34. Each train, while running, must display two green flags by day and two green lights by night, one on each side of the rear of the train, as Markers, to indicate the rear of the train. Yard engines will not display Markers.

35. Each train running after sunset, or when obscured by fog or other cause, must display the head-light in front, and two or more red lights in the rear. Yard engines must display two green lights instead of red, except when provided with a head-light on both front and rear.

36. Each car on a passenger train while running must be in communication with the engine. In the absence of an equivalent appliance, a bell cord must be attached to the signal bell of the engine, passing through or over the entire length of the train, and secured to the rear end of it.

37. Two green flags by day and two green lights by night, displayed in the places provided for that purpose on the front of an engine, denote that the train is followed by another train, running on the same Schedule and entitled to the same Time-table rights as the train carrying the signals.

38. Two white flags by day and two white lights by night, displayed in the places provided for that purpose on the front of an engine, denote that the train is an extra. These signals must be displayed by all extra trains, but not by yard engines.

39. When an engine is running backward pulling a train, or without a train, the classification signals as per Rules Nos. 37 and 38 shall be displayed in the places provided for that purpose on the tender. When an engine is pushing cars ahead of it, the classification signals shall be displayed on the front of the leading car which is being pushed.

40. A blue flag by day and a blue light by night, placed on the end of a car, denote that car inspectors are at work under or about the car or train. The car or train thus protected must not be coupled to, or moved, until the blue signal is removed by the car inspectors.

When a car or train standing on a siding is protected by a Blue Signal, other cars must not be placed in front of it so that the Blue Signal will be obscured, without first notifying the car inspector, that he may protect himself.

[Note.—The Committee finds on investigation that the combined green and white signal denoting an irregular train following, as suggested by the "Committee on Uniform Train Signals" in its report of October 11, 1883, and adopted by the Convention of October 9, 1884, is unsatisfactory and is used by a very limited number of roads. As your Committee has found it impracticable to suggest any combination of signals sufficiently distinct from other signals, they do not recommend the carrying of any signal denoting an irregular train following, and have therefore omitted the signal from the Rules.]

Whistle Signals.

41. One long blast of the whistle is the signal for approaching stations, railroad crossings and junctions (thus, —).

42. One short blast of the whistle is the signal to apply the brakes—stop (thus, —).

43. Two long blasts of the whistle is the signal to throw off the brakes (thus, — —).

44. Two short blasts of the whistle is an answer to any signal, except "train parted" (thus, — —).

45. Three long blasts of the whistle (to be repeated until answered as provided in Rule No. 64) is a signal that the train has parted (thus, — — —).

46. Three short blasts of the whistle when the train is standing (to be repeated until answered, as provided in Rule No. 63) is a signal that the train will back (thus, — — —).

49. Four long blasts of the whistle is the signal to call in the flagman (thus, — — — —).

48. Four short blasts of the whistle is the engineer's call for signals from switch-tenders, watchmen, trainmen and others (thus, — — — —).

49. Five short blasts of the whistle is a signal to the flagman to go back and protect the rear of the train (thus, — — — — —).

50. One long followed by two short blasts of the whistle is a signal to be given by trains on single track, when displaying signals for the following train, to call the attention of trains of the same or inferior class to the signals displayed (thus, — — —).

[Note.—In order to avoid duplicating signals, the Committee has recommended that the above-named signal be substituted for the three short blasts now used, with which much dissatisfaction has been expressed. In the opinion of some of the Committee this rule is unnecessary.]

51. Two long, followed by two short, blasts of the whistle is the signal for approaching road crossings at grade (thus, — — — —).

52. A succession of short blasts of the whistle is an alarm for persons or cattle on the track, and calls the attention of trainmen to danger ahead.

Bell-cord Signals.

53. One tap of the signal-bell, when the train is standing, is the signal to start.

54. Two taps of the signal-bell, when the train is running, is the signal to stop at once.

55. Two taps of the signal-bell, when the train is standing, is the signal to call in the flagman.

56. Three taps of the signal-bell, when the train is running, is the signal to stop at the next station.

57. Three taps of the signal-bell, when the train is standing, is the signal to back the train.

58. Four taps of the signal-bell, when the train is running, is the signal to reduce speed.

59. When one tap of the signal-bell is heard while a train is running, the engineer must immediately ascertain if the train is parted, and, if so, be governed by Rule No. 105.

60. Signals of the same number of sounds shall have the same significance when given by other appliances than bell-cords and signal-bells.

Lamp Signals.

61. A lamp swung across the track is the signal to stop.

62. A lamp raised and lowered vertically is the signal to move ahead.

[See note under Rule 92.]

63. A lamp swung vertically in a circle across the track, when the train is standing, is the signal to move back.

64. A lamp swung vertically in a circle at arm's length across the track, when the train is running, is the signal that the train is parted.

65. A flag, or the hand, moved in any of the directions given above, will indicate the same signal as given by a lamp.

Fixed Signals.

66. Fixed signals are placed at junctions, railroad crossings, stations and other points that require special protection. Special instructions will be issued indicating their position and use.

Rules Governing the Use of Signals.

67. A signal imperfectly displayed, or the absence of a signal at a place where a signal is usually shown, must be regarded as danger signal, and the fact reported to the Superintendent.

68. The unnecessary use of the whistle is prohibited; when shifting at stations and in yards the engine-bell should be rung, and the whistle used only when required by law, or when absolutely necessary to prevent accident.

69. The whistle must not be sounded while passing a passenger train, except in cases of emergency or danger, or when required by the rules.

70. When a danger signal (except a fixed signal) is displayed to stop a train, it must be acknowledged as provided in Rule No. 44.

71. The engine-bell must be rung before starting a train, and when running through tunnels and the streets of towns or cities.

72. The engine-bell must be rung for a quarter of a mile before reaching every road crossing at grade, and until it is passed; and the whistle must be sounded at all whistling posts.

73. When two or more engines are coupled to the head of a train, the leading engine only shall display the signals as provided in Rules Nos. 37, 38 and 39.

74. One flag or light displayed as a classification signal will be regarded the same as if two were displayed; but conductors and enginemen will be held responsible for the proper display of all train signals.

75. When a train is being pushed by an engine (except when shifting and making up trains in yards) a white light must be displayed on the front of the leading car at night, or when the train is obscured by fog or other cause. (See Rule No. 39.)

76. When a train turns out to meet or pass another train the red lights must be removed and green displayed as soon as the track is clear; but the red must again be displayed before returning to its own track.

Head-lights on engines when on side tracks or at the end of double tracks, waiting for trains must be covered as soon as the track is clear and the train has stopped.

77. The combined green and white signal is to be used to stop a train only at the flag stations designated by the schedule of that train. When it is necessary to stop a train at a point that is not a flag station for that train, a red signal must be used.

78. White signals must be used by watchmen at public road and street crossings to prevent persons and teams from crossing when trains are approaching. Danger signals must be used only when necessary to stop trains.

79. Torpedoes must not be placed near stations or road crossings where persons are liable to be injured by them.

80. All signals must be used strictly in accordance with the rules, and trainmen and enginemen must keep a constant lookout for signals.

[Note.—In connection with the subject of signals the Committee recommend that no cross-bars or telegraph poles placed along the lines shall be permitted to be painted red or green.]

TRAIN RULES.

Classification of Trains.

81. All trains shall be designated as regular or extra. Regular-trains are those represented on the Time-table, and may consist of one or more sections. All sections of a train, except the last, must display signals as provided in Rule 37. Extra trains are those not represented on the Time-table. An engine without cars, in service on the road, shall be considered a train.

82. All regular trains shall be classified on the Time-table with regard to their priority of right to the track; trains of the first class being superior to those of the second and all succeeding classes, and trains of the second class being superior to those of the third and all succeeding classes; and so on indefinitely. The terms passenger, freight and mixed are descriptive and do not refer to class.

83. Extra trains may be distinguished as:

Passenger, or Special Extra;
Freight Extra;
Work Train Extra.

84. All extra trains are of inferior class to all regular trains of whatever class.

Movement of Trains.

85. A train of inferior class must in all cases keep out of the way of a train of superior class.

86. On single track, all trains in one direction (to be specified on Time-table) will have the absolute right of track over trains of the same class running in the opposite direction.

[Note.—It being represented to the Committee that some of the roads represented in the Convention will be unable, on account of limited telegraph facilities, and other local causes, to carry out this rule in its literal meaning and full scope, it is suggested by the Committee that such roads may issue regulations to arrange this matter in some other way. The Committee believe, however, that a test of the rule, as approved by the Committee, and its literal enforcement, will result to the entire satisfaction of those using it.]

87. When trains of the same class meet on single track, the train not having right of track must take the siding and be clear of the main track before the leaving time of the opposing train; but such train must not pass the switch to back in on a siding, until after the arrival of the opposing train, unless otherwise directed by special instructions. When necessary to back in on the siding, before passing the switch, a flagman must be sent out in the direction of the opposing train as per Rule No. 101.

[See note under Rule 88.]

88. When a train of inferior class meets a train of superior class on single track, the train of inferior class must take the siding and clear the train of superior class five minutes. A train of inferior class must keep five minutes off the time of a train of superior class following it.

[Note on Rules Nos. 87 and 88.—The Committee recommend, in case grades or other conditions are such that on any line or part of a line greater precision is necessary, Rule No. 87 should require a clearance of FIVE minutes, and Rule No. 88 of TEN minutes.]

89. A train must not leave a station to follow a passenger train until five minutes after the departure of such passenger train, unless some form of block signal is used.

90. Passenger trains running in the same direction must keep not less than five minutes apart, unless some form of block signal is used.

91. Freight trains following each other must keep not less than five minutes apart (except in closing up at stations or at meeting and passing points) unless some form of block signal is used.

[See note under Rule 92.]

92. No train must leave a station expecting to meet or to be passed at the next station by a train having the right of track, unless it has full schedule time to make the meeting or passing point, or unless it has the full time allowed between stations (to be shown on the margin of the Time-table) to make the meeting or passing point, and clear the track by the times required by Rules Nos. 87 and 88.

[Note.—The Committee recommend, in case grades or other conditions are such that on any line or part of a line greater precision is necessary, Rules Nos. 91 and 92 should allow a clearance of TEN minutes or more.]

93. A train not having right of track must be entirely clear of the main track by the time it is required by rule to clear an opposing train or a train running in the same direction; failing to do so, it must be immediately protected, as provided in Rule No. 101.

94. Except at meeting or passing points, as provided in Rules Nos. 87 to 93, inclusive, no train must arrive at a station in advance of its schedule arriving time, when shown.

No train must leave a station in advance of its schedule leaving time.

95. All trains must stop at schedule meeting or passing points on single track, if the train to be met or passed is of the same class, unless the switches or signals are plainly seen to be right, and the track clear. The point at which a train should stop is the switch used by the train to be met or passed in going on the siding.

When the expected train of the same class is not found at the schedule meeting or passing point, the train having right of track must approach all sidings prepared to stop, until the expected train is met or passed.

96. All trains must approach the end of a double track, junctions, railroad crossings at grade, and drawbridges, prepared to stop, and must not proceed until the switches or signals are seen to be right, or the track is plainly seen to be clear. Where required by law, all trains must stop.

97. No train must leave a junction, a terminal, or other starting point, or pass from double to single track, until it is ascertained that all trains due, which have the right of track against it, have arrived.

98. When a passenger train is detained at any of its usual stops more than — minutes, the flagman must go back with danger signals and protect his train, as provided in Rule No. 101; but if it stops at any unusual point, the flagman must immediately go back far enough to be seen from a train moving in the same direction when it is at least half a mile from the rear of his own train, and if the stop is over — minutes he must be governed by Rule No. 101.

When it is necessary to protect the front of the train, the same precautions must be observed by the fireman. If the fireman is unable to leave the engine, the front brakeman must be sent in his place.

[Note.—The Committee, on account of the existing great diversities of grades, amount of traffic and other local circumstances, have left blanks in Rule No. 98 for each company to fill out, after determining what times, if any, are necessary, either for their road as a whole or for each division.]

99. When a freight train is detained at any of its usual stops more than — minutes, where the rear of the train can be plainly seen from a train moving in the same direction at a distance of at least —, the flagman must go back with danger signals not less than —, and as much farther as may be necessary to protect his train; but if the rear of his train cannot be plainly seen at a distance of at least —, or if it stops at any point that is not its usual stopping place, the flagman must go back not less than —, and if his train should be detained until within ten minutes of the time of a passenger train moving in the same direction, he must be governed by Rule No. 101.

When it is necessary to protect the front of the train, the same precautions must be observed by the fireman. If the fireman is unable to leave the engine, the front brakeman must be sent in his place.

[Note.—The Committee, finding that the distances and times necessary for flagmen to go back differ so much on account of grades, amount of traffic and other local circumstances, have left blanks for each company to determine what distance and time is necessary, either for their road as a whole, or for each division.]

100. When it is necessary for the flagman to go back to protect the rear of his train, the next brakeman must immediately take the flagman's position on the train, and remain there until relieved by the flagman; and on passenger trains the baggage-master must take the place of the front brakeman whenever necessary.

101. When a train is stopped by an accident or obstruction, the flagman must immediately go back with danger signals to stop any train moving in the same direction. At a point — from the rear of his train he must place one torpedo on the rail; he must then continue to go back at least — from the rear of his train and place two torpedoes on the rail, ten yards apart (one rail length), when he may return to a point — from the rear of his train, and he must remain there until recalled by the whistle of his engine; but if a passenger train is due within ten minutes, he must remain until it arrives. When he comes in, he will remove the torpedo nearest to the train, but the two torpedoes must be left on the rail as a caution signal to any following train.

If the accident or obstruction occurs upon single track, and it becomes necessary to protect the front of the train, or if any other track is obstructed, the fireman must go forward and use the same precautions. If the fireman is unable to leave the engine, the front brakeman must be sent in his place.

[See note under Rule 99.]

102. Freight trains having work to do on any other track may cross over if no passenger train is due, provided no approaching freight train is in sight; and also provided that a flagman has been sent with danger signals, as provided in Rule No. 101, not less than — in the direction of the expected train.

[See note under Rule 99.]

103. When a freight train on double track turns out on to the opposite track to allow a passenger train running in the same direction to pass, and while waiting, a passenger train from the opposite direction arrives, the freight train may cross back and allow it to pass, provided the other passenger train is not in sight; and also provided that a flagman has been sent with danger signals, as provided in Rule No. 101, not less than — in the direction of the expected train.

[See note under Rule 99.]

104. When it is necessary for a freight train on double track to turn out on to the opposite track to allow a passenger train running in the same direction to pass, and a passenger train running in the opposite direction is due, a flagman must be sent back with danger signals, as provided in Rule No. 101, not less than — in the direction of the following train, and the freight train must not cross over until one of the passenger trains arrives. Should the following passenger train arrive first, a flagman must be sent forward on the opposite track with danger signals, as provided in Rule No. 101, not less than — in the direction of the overdue passenger train before crossing over. Great caution must be used, and good judgment is required to prevent detention to either passenger train. The preference should always be given to the passenger train of superior class.

[See note under Rule 99.]

[Note.—In regard to backing trains upon the main track, or

crossing over on double track to move in the wrong direction to avoid obstructions, the Committee believe that, owing to the different conditions of the train service, etc., on the various roads, it is impossible to formulate a rule which can be generally adopted, and therefore recommend that each company issue such special instructions to cover this case as its circumstances may require.]

105. If a train should part while in motion, trainmen must use great care to prevent the detached portion from coming into collision. Enginemen must give the signal as provided in Rule No. 45, and keep the front part of the train in motion until the detached portion is stopped.

The front portion will have the right to go back, regardless of all trains, to recover the detached portion, first sending a flagman with danger signals — in the direction in which the train is to be backed, and running with great caution at a speed not exceeding four miles per hour. On single track all the precautions required by the rules must also be taken to protect the train against opposing trains. **The detached portion must not be moved or passed around until the front portion comes back.** This rule applies to trains of every class.

An exception will only be made to the above when it is known that the detached portion has been stopped, and when the whole occurrence is in plain view, no curves or other obstructions intervening, so that signals can be seen from both portions of the train. In that event the conductor and engineman may arrange for the recoupling, using the greatest caution.

[See note under Rule 99.]

106. When a train is being pushed by an engine (except when shifting and making up trains in yards), a flagman must be stationed in a conspicuous position on the front of the leading car, so as to perceive the first sign of danger and immediately signal the engineman.

107. A train starting from a station, or leaving a junction, when a train of the same class running in the same direction is overdue, will proceed on its own time and rights, and the overdue train will run as provided in Rule 90 or 91.

108. A train which is delayed, and falls back on the time of another train of the same class, does not lose its rights.

109. Regular trains twelve hours or more behind their schedule time lose all their rights.

110. A train overtaking another train of the same or superior class, disabled so that it cannot move, will run around it, assuming the rights and taking the orders of the disabled train, to the next telegraph office which is open, where it will report to the Superintendent. The disabled train will assume the rights of the last train passing it, till the next telegraph office is reached.

111. All messages or orders respecting the movement of trains or the condition of track or bridges must be in writing.

112. Passenger trains must not display signals for a following train without an order from the Superintendent; nor freight trains without an order from the yard master.

113. Extra trains must not be run on single track without an order from the Superintendent.

114. When signals displayed for a following train on single track are taken down at any point before the following train arrives, the conductor must inform the Superintendent promptly by telegraph, and also the operator or switch-tender; and the latter, unless there is some other provision for the purpose, must notify all opposing trains of the same or inferior class leaving that point before the train arrives for which signals were displayed.

If signals are taken down at a point where there is no operator, switch-tender or other provision for the purpose, the conductor must notify all opposing trains of the same or inferior class until he reaches the next telegraph office, when he must inform the Superintendent; and the operator, unless there is some other provision for the purpose, must notify all opposing trains of the same or inferior class, until directed otherwise by the Superintendent.

If the train for which signals were displayed leaves the main line at a point where there is no operator, switch-tender or other provision for the purpose, a flagman must be left to notify opposing trains that it has arrived.

115. Work trains will be run as extras under special orders, and will be assigned working limits.

116. Great care must be exercised by the trainmen of a train approaching a station where any train is receiving or discharging passengers.

117. Enginemen must observe trains on the opposite track, and if they are running too closely together call attention to the fact.

118. No person will be permitted to ride on an engine except the engineman, firemen and other designated employees, in the discharge of their duties, without a written order from the proper authority.

119. Conductors will be held responsible for the proper adjustment of the switches used by them and their trainmen, except where switchtenders are stationed.

Whoever opens a switch shall remain at it until it is closed, unless relieved by some other competent employee.

When there is more than one train to use a switch, it must not be left open unless one of the trainmen of the following train is at the switch and takes charge of it.

120. Accidents, detention of trains, failure in the supply of water or fuel, or defects in the track or bridges, must be promptly reported by telegraph to the Superintendent.

121. No train shall leave a station without a signal from its conductor.

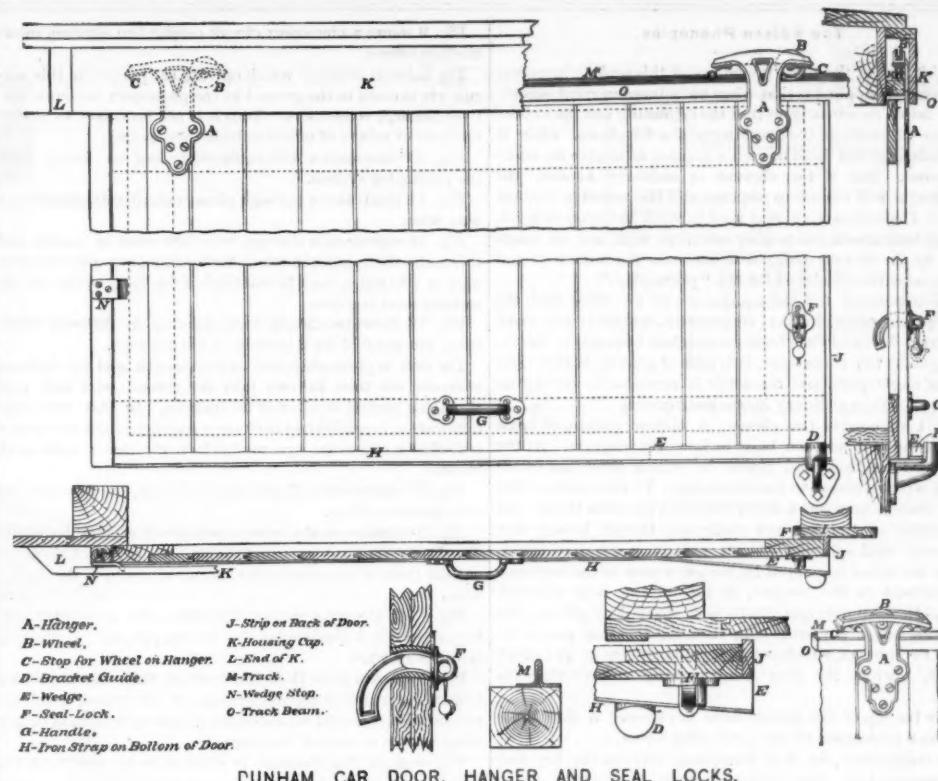
122. Conductors and enginemen will be held equally responsible for the violation of any of the rules governing the safety of their trains, and they must take every precaution for the protection of their trains, even if not provided for by the Rules.

123. In all cases of doubt or uncertainty, take the safe course and run no risks.

Cosgrove's Dividing Brake Valve.

It is an admitted convenience in handling trains with air brakes to be able to apply and release the brakes to either the engine or cars, or both, at pleasure. The device illustrated, which we are informed has been in use for nearly two years on engines of all classes on the Central Railroad, of Georgia, and less extensively on some other roads, is designed for this purpose. Its method of operation will be readily followed from the drawings. It is the invention of Mr. E. J. Cosgrove, of Augusta, Ga.

The triple valve that supplies air to the driver brakes is coupled to elbow *M* by a $\frac{1}{2}$ -in. gas pipe, and the driver brake cylinders are coupled to elbow *L* by a $\frac{1}{2}$ -in. gas pipe, thus carrying the air on its passage from the right valve to the driver brake cylinders through the valve. The cams *A*, fig. 1, are secured to the front end of the handle of the engineer's valve by suitable screws, or they may be solid, as shown in *G*. Fig. 2 is the main valve, which seats at *H*, thus closing communication between the elbows *L* and *M*, figs. 1 and 2, when the valve is seated. *N* is a valve inside of the main valve *G*, which seats at *O*. The main valve *G* is opened by either



DUNHAM CAR DOOR, HANGER AND SEAL LOCKS.

of the cams *A*, fig. 1, on the brake valve handle coming in contact with the projecting head of the valve *N*, and holding it (*N*) closed. When the cam is moved from contact with *N*, the spring *P* closes *G*, and *N* is free to open.

To apply the car brakes move the handle to the right (or left, as the cut stands) until air enough is released to set them. This will not bring the cam in contact with the valve stem. To also apply the driver brakes move the handle further to the right against stop *E*, fig. 4. This brings the opposite cam to *A* against the valve stem *A*, fig. 2, opens the valve by

without any thought on his part. Attention is needed only to split the brakes.

An objection which has been urged against separating the driver brake has been that it was needed so little that when wanted it was often out of order. With this device, whenever the tender and train brakes are released, the driver brake valve is opened by the same operation, and the compressed air passes into the driver brake cylinders, but on account of escaping through the discharge in the triple valve at same time it does not have pressure to apply the driver brake hard enough to have any retarding effect on the engine, while it does keep the leather packing in the driver brake piston and in the piston-rod stuffing boxes set out, thus keeping the brake in good condition for service when needed.

In practice, however, it is alleged that engineers use the driver brakes every trip, more or less, if fitted with the dividing attachment.

Dunham Car Door, Hanger and Seal Lock.

One of several advantages claimed for this car door, which has recently been introduced, is that it is not affected by the shrinking or swelling of wood in either car or door. The door is supported from above by an anti-friction hanger of the roller journal-bearing type, having a double rider bar *A*, grooved wheel *B*, and steel inverted *T* track *M*. During the process of opening or closing the door the wheel travels between the projecting stops *C* and *C*, causing of necessity very little friction. The wheel *B* bears on its broad face on the bottom flanges only of the *T* track rail *M*, the upright flange supporting no weight, but serving merely as a guide for the wheel. The hanger is designed to allow considerable play between the top of the door and the supporting beam *O* for the track, while yet making it impossible for the door to become derailed.

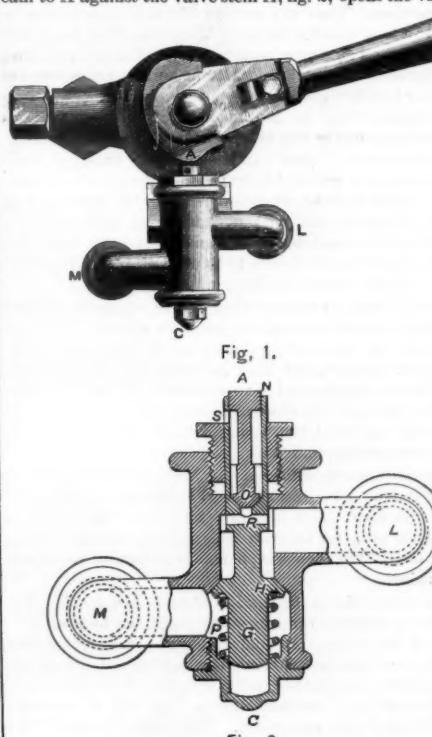
The hangers are made of air furnace refined malleable iron with lathe turned Bessemer steel axle and wheels. The door used is a common oak frame, sheathed, with the addition at the end of the protecting strip *J*, which is made to engage closely with the strip *I* attached to the outside of door-post when the door is closed by the wedge *E*, at the bottom of the door, engaging with the bracket guide *D*. An iron guard strap is also placed on the bottom of the door, thus forming what is claimed to be a complete and absolute protection against storm or sparks without any chance for annoyance from shrinking or swelling, as is possible with a flush or semi-flush door. One guide only is needed at the bottom of the door, the wedge stop *N* holding the door fast shut, when closed along the other edge.

For protection against snow or ice at the top of door a wooden cap *K* is fastened at the end to the block *L*.

The seal lock *F* is claimed to be a decided improvement over most of those now in use, because of its simplicity and strength. It is attached to the side of the door, and engages with the inner door-post when bolted. It is held either open or closed by gravity. It may be used either with seal or lock, or both, but nothing whatever is required to hold the door absolutely secure, unless it is desired to lock it.

The distinguishing merits claimed for this door are: (1) That the door when closed is absolutely tight. (2) That as soon as it begins to open it hangs free, so that there is no possibility of annoyance from binding due to shrinkage or twisting of any part of the door or car. (3) That it can be opened under all conditions with a most trifling force. (4) That its construction ensures durability.

Both of the devices described have been tested on quite an extensive scale by various roads within the last year, we have been informed, with favorable results. They are controlled by the Dunham Manufacturing Co., of Boston, Mass.



Cosgrove's Dividing Brake Valve.

unseating it at *H*, and allows air to pass into the driver brake cylinders, applying them.

To release the driver brakes alone move the handle to the left until the cam allows the valve *G* to seat again. This allows the air in the driver brake cylinders to unseat the release valve *O* in valve-stem and escape through the opening *R* shown in valve stem, but does not release the tender brake.

To release all brakes including driver brakes move handle against stop.

The cam *A*, fig. 1, holds the valve open as long as the handle is in release or running position, but when the handle is moved to the right (left in the cut) the cam releases the valve, allows it to seat, and cuts off communication with the driver brakes before the handle moves far enough to apply the tender and train brakes; this makes the device as shown in the cuts automatic, that is to say, the driver brake will apply itself automatically whenever the train brakes go on.

An advantage claimed for the device is that it is handy, there being only one handle to operate. Consequently, in an emergency, when an engineer throws on his brakes full to the top, he also applies the driver brake by the same operation

The Edison Phonoplex.

In this, one of the latest inventions of this prolific inventor, the principle applied is that when an induced current is gradually raised in intensity so that the beginning and the extinction are not sudden, the diaphragm of a telephone, while it responds, does not do so in such a manner as to give an audible sound. But if the current is suddenly broken, the diaphragm will vibrate in response and the message become plain. The ordinary current used to work the relay of a telegraph instrument will neither interfere with nor be interfered by the current designed to pass over the same wire and at the same time designed for the "phonoplex."

The apparatus for the equipment of an office with the phonoplex consists of a key, transmitter, magnetic coil, small resistance box and the phone—which last responds to incoming signals; two condensers, two cells of gravity battery and four of electropoim, and the whole is arranged to occupy no more space than ordinary Morse instruments.

Fig. 1 represents the phone. A hollow column of brass resting upon a wooden base incloses the magnets. At the lower end is a rack and pinion by which these can be adjusted with reference to the diaphragm. To the centre of the latter there is attached a screw-threaded pin with thumb nut and binder at the top, and encircling the pin loosely is a hardened steel split ring which rests upon the diaphragm. When the latter is snapped by the attraction of the momentary current in the magnet, it throws the ring violently against the stop nuts and produces a sharp, loud click. The steel ring has a pin projecting from its side that passes between two prongs, which, while permitting free up and down motion, prevent the ring from turning and altering the sound.

Over the top of the phone there is clamped a thin brass plate as a protection for the projecting screw.

The transmitter, fig. 2, is interposed between the key and the magnetic coil. The former operates the magnet of the transmitter, the object of which is to send uniform currents to the line and also to short-circuit the phone each time the coil battery circuit is broken, and thus obviate the annoyance which would otherwise be caused by the violent discharge close to the diaphragm.

In a small magnet, fig. 3, is stored the energy which is exerted on the line for the purpose of operating the phones. As it is necessary to produce an instantaneous discharge, a condenser is connected around the points of the transmitter, which make and break the circuit around the coil.

The key, fig. 4, is so constructed that when the lever is "opened" or thrown to the right, it closes the circuit around the magnetic coil through the points of the transmitter, and when "closed" or thrown to the left, it opens this battery and at the same time short-circuits the magnetic coil. The necessity for this lies in the fact that an open circuit electroplate battery of low resistance is employed, which it is desirable to use only when occasion requires the transmission of signals, and also that the resistance of the coil has an audible effect in the phone when it remains in the line to retard incoming currents.

Thus, while the manipulation of the key accomplishes all the objects it is desirable to attain, it introduces no innovation, as the same movements to which operators are accustomed are maintained—"opening" for the transmission and "closing" for the reception of business.

A small resistance box, fig. 5, is interpolated in such a way that when the current through the magnetic coil is broken on the up-stroke it passes through the spools. This is to produce an audible distinction between the up and down movement as manifested in the phone, the former being lighter than the latter, so as to prevent confusion that otherwise would be occasioned by operators getting the "back-stroke."

The diagram, fig. 6, shows all the instruments in place. All Morse keys and relays within the limits of a phonoplex circuit are bridged as represented, by a condenser through which pass the induced currents that operate the phones. It will be readily seen that the main line, which passes through the magnetic coil and through the phone, is never broken, the former being charged and discharged by means of an extra circuit around it through its key and the points of the transmitter.

This explains the previous statement to the effect that a phonoplex circuit remains intact so long as there is no actual breakage of the wires to which it is attached.

The outer diagrams will illustrate the manner in which extra circuits may be derived on Morse lines.

Commercial Way or Railroad Wires.—The black line in fig. 7 represents the established Morse circuit.

The black dots represent the offices through which it passes. The dotted line represents the extra phonoplex circuit.

Fig. 7 shows all offices equipped and doubled in their capacity.

In order to understand thoroughly the advantage derived from these extra circuits, as shown in the above and following diagrams, it is only necessary to bear in mind the fact that a phonoplex circuit provides facilities between such points as are included in it, the same as though an additional wire had been strung without reference to the line to which it is attached.

Fig. 8 shows half the offices doubled in their capacity.

Those which are touched by the dotted line can communicate with each other either on the Morse side or by means of the phonoplex circuit.

In the "blind" stations—those which the dotted line avoids—the keys and relays are bridged by condensers to afford a channel through them for the phone currents. They can at any time be included in the phone circuit by the introduction of the necessary instruments.

Fig. 9 shows a phonoplex circuit established between intermediate offices.

The induced currents which operate the phones in this circuit are thrown to the ground at the phonoplex terminal stations through condensers. Thus it is not necessary to bridge the keys or relays of offices outside these points.

Fig. 10 represents a wire equipped to half its length with the phonoplex system.

Fig. 11 illustrates a through phone circuit established on a way wire.

Fig. 12 represents a through wire 300 miles in length, and illustrates the manner in which three extra phonoplex circuits, each of 100 miles, may be established for the purpose of absorbing local business.

Fig. 13 shows two Morse wires running in different directions, but parallel for a portion of the distance.

The first is phonoplexed to half its length, and the induced currents are then thrown into the second wire and pass through a partial number of its stations. In this way communication is established between a number of offices on each wire which otherwise are unable to work direct with each other.

Fig. 14 represents a Morse duplex circuit, the wire passing intermediate offices.

The illustration shows how communication may be established between these intermediate stations, or any of them, by cutting them in on a phonoplex circuit annexed to the duplex wire.

Fig. 15 in the same manner illustrates the phonoplex system applied to a quadruplex line for the purpose of utilizing it as a way wire.

It will be seen from these illustrations that the phonoplex system is capable of a great variety of convenient combinations which it would be impossible to effect by means of any other known system of telegraphy.

The cost of maintenance is claimed to be very light, the only actual outlay required being for the provision of battery material. This expenditure varies with the amount of work done, but assuming the phonoplex transmitter to be in constant operation for 12 hours during each of the 30 days, the cost of renewing the battery is reported not to exceed \$1.50 per month.

On wires exceeding 100 miles in length, phonoplex circuits may be added, the first starting at the initial office and doubling the capacity to a distance of 100 miles beyond, including or excluding intermediate stations; the second commencing where the first ends and continuing 100 miles further, and the third and fourth following in turn under like conditions. Thus any number of extra circuits may be added to a long wire for the purpose of absorbing local business, which as a rule circulates within a radius not exceeding 100 miles of its source. In addition to this, phonoplex circuits may be established between two or more offices on a wire, whether they be intermediate or terminal, without necessarily equipping any other portion of the same system.

The phonoplex system can be applied to duplex or quadruplex wires and operated from the same terminals, or intermediate offices may be cut in and permitted to work as on an ordinary Morse circuit, without interfering with the operation of duplex or quadruplex instruments at either end. This enables a long stretch of wire to be utilized, which at present serves only two separate points.

In wet or heavy weather, when Morse wires are rendered almost unworkable through the presence of heavy escapes, it is said that the phonoplex circuits on the same lines are not in the least impaired, and that instances have been frequent where Morse signals could be transmitted only half the length of a wire, owing to the cause mentioned, while the phonoplex system was operated the whole distance the same as under the most favorable conditions.

The improvements made since the days of the old paper recording instruments—repeaters and automatic operators, the duplex and quadruplex systems, etc.—have had comparatively little value for railroad telegraphing, especially on the smaller lines. For these the phonoplex is claimed to have especial value.

The action of the phonoplex is limited to practice to about 100 miles in distance for proper efficiency, but by it all or a portion of the intermediate offices may be doubled in their capacity, or communication can be established between terminal points only, whether such points be intermediate offices on a Morse wire or terminal stations, all that is necessary being the phonoplex equipment. This instrument also will enable an operator to avoid the delay and interference due to train orders if he has an important message to send, and it will further enable an officer to send a message which will only affect the instrument in the office he desires to communicate with and not any intermediate office or the one beyond the one desired. This is accomplished by increasing the intensity of the current proportionate to the distance intervening. Thus privacy is insured, and no one who has ever sent a private message, or one desired to be private, but knows it is the surest way to attract the attention of every operator on the line. The plan of ordering all offices but the desired one to "cut out," renders the taking of the message by every operator on the line about as certain as sunrise.

Again in a railroad using but one wire, and the entire line cannot be rendered useless by the carelessness of some operator who has failed to close his key. So long as the wire is unbroken the phonoplex will work.

Where many wires are strung between a number of important points, being tapped in their course at offices of minor importance, the phonoplex can be operated either wholly or in a part as a through circuit, and thus relieve the pressure of business at certain points only, by doubling the capacity of the existing wires.

The most remarkable feature of the phonoplex is shown in Fig. 18, which illustrates a method of applying the system to two wires with the object of making an additional circuit between offices which are not in direct communication with each other.

Wire No. 1 is phonoplexed to the point of intersection with wire No. 2, at which point a condenser is connected across the wires, and affords a channel through which the induced currents can pass to such offices on wire No. 2 as may be equipped for their reception.

This method is known as "jumping," and is found valuable as a means of establishing direct communication between the different divisions of railroads.

Providing the total length of the proposed phonoplex circuit does not exceed its capacity of 100 miles, no limit need be placed upon the number of wires to which these jumps are made.

The operation of the system is very simple, and the instruments are as easily and readily adjusted as a Morse relay. Incoming signals are of the same character and as loud as an ordinary sounder.

The apparatus may be seen in operation at the New York Produce Exchange.

Western Railway Club.

The following circular has been issued by the Executive Committee, composed of Messrs. W. A. Scott, H. L. Cooper, W. B. Snow and Angus Sinclair:

The meetings of the Western Railway Club will be held at the Grand Pacific Hotel, Chicago, at 2 P. M., on the third Wednesday of each month. We wish to request that you will make an effort to be present at the meetings of this club, and that you will use your personal and official influence to induce others interested in railway rolling stock matters to attend. We are firmly persuaded that western railway interests might be materially benefited by the work done by this club, and it lies with railway men in the West to make it a success and a power. Most railroad men now recognize the important character of the work done by the Master Car Builders' and the Master Mechanics' associations, but there is reason to believe that some of the work accomplished by these associations at their annual conventions is settled without receiving mature consideration. The members of committees are familiar with the details of subjects they are appointed to investigate, but the mass of members often know little about the questions their votes go to decide, and the time for discussion is so limited that decisions are arrived at and recommendations made which do not entirely represent the views of the association at large.

Now we believe that the Western Railway Club, and similar organizations, could do valuable services to railroad interests by discussing in advance questions under investigation or consideration by the Master Car Builders' and the Master Mechanics' associations. There are also interests relating to rolling stock, and to railroad operating, peculiar to western railroads; and we believe these would be promoted and harmonized by a strong Western Railway Club.

Brotherhood of Locomotive Engineers.

The annual convention of the Brotherhood of Locomotive Engineers began in New York, Oct. 20, with a large attendance. The meeting has attracted much public attention.

The opening public exercises were held in the Metropolitan Opera House, which was crowded with delegates, invited guests and spectators.

Chairman William H. Gurney opened the meeting with a speech of greeting to the guests, and then the Rev. Delos Everett, Grand Chaplain of the Brotherhood, offered prayer. Then Mayor Grace was introduced and made a short speech welcoming them to the city. This was followed by addresses from Gov. Abbott, of New Jersey, and Rev. Dr. T. De Witt Talmage.

Grand Chief Engineer Arthur then made his annual address, in which he said that now that the intellect, and also the ignorance, of the nation was knitting its brow over the solution of the so-called knotty problem of the nineteenth century, it was fitting that the Brotherhood, representing the unknown quantity of that problem, should meet together. In describing it as the unknown quantity he would say that some had tried to equivocate their position and that of their executive officer, because of the conservative stand taken and his utter refusal to treat with other labor organizations. They maintained that a good labor organization was a good thing, but that a heterogeneous mass of men engaged in divers occupations could combine interests satisfactorily to form an organization which should serve all and with equal justice was very doubtful. Until there was nothing more to be done for the Brotherhood, could they afford to become interested in other things foreign to their order? They had no sympathy and could not co-operate with any class of men who based their claim for it on the principles that might be right and that the rich owe the poor a living. No man had a right to anything which he had not acquired honestly.

There was no antagonism between capital and labor, continued Mr. Arthur, but between work and idleness there had never been any other feeling. Most men of frugal habits were capitalists, capital being invested wealth, no matter how small. He urged upon the Brotherhood the desirability of life insurance and recommended that its system be modified so as to allow members not so well off to take out policies of \$1,500 instead of \$3,000, as at present. The Brotherhood's Life Insurance Association now had 4,444 members. Twenty-seven members had died during the year and two had become disabled. Seventy-eight claims had been paid, amounting to about \$280,000. He was sure that the labor agitation of the past six months would result in good. What was necessary to settle the questions at issue was for both sides to give them full and fair consideration, which could only be reached by arbitration.

The public would always condemn the willful destruction of private property and the stopping of public business. During the Missouri Pacific and Texas Pacific and troubles of last spring the Brotherhood conducted itself in a way worthy of praise in resisting the threats and persuasions of the Knights of Labor. This loyalty had shown the railroad companies that a contract entered into by the Brotherhood would not be violated, and the companies would not hesitate to make other contracts with it when the occasion called for it. Moderation, conciliation and arbitration must rule in dealings between employers and employees. Capital could not afford to be overbearing, and labor could not turn from peaceful channels without injury.

The Hon. Chauncey M. Depew, President of the New York Central Co., made a stirring address, in which he said that he concurred heartily in every sentiment expressed in Chief Arthur's address. The great Republic owed all its greatness and glory to the railroads. Thanks to the Brotherhood, said Mr. Depew, the engineer of to-day was a very different man



Fig. 1.—The Phone.

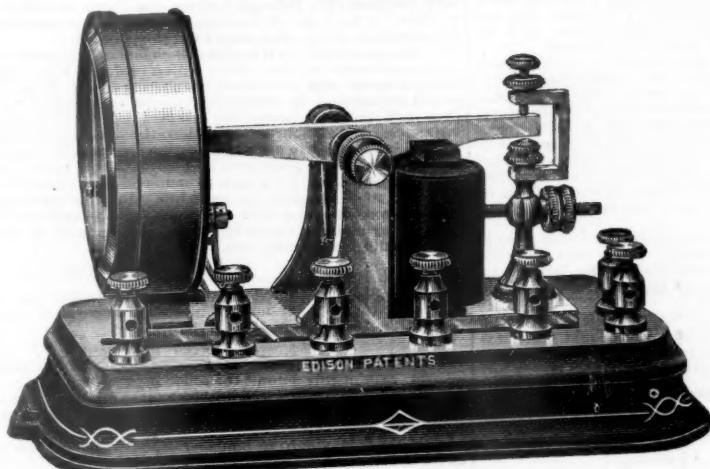


Fig. 2.—The Transmitter.

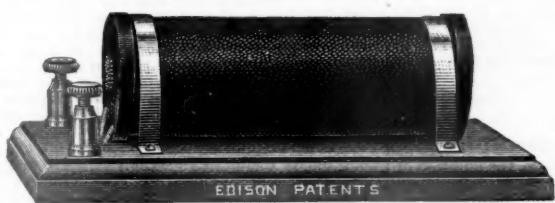


Fig. 3.—The Magnetic Coil.



Fig. 4.—The Key.

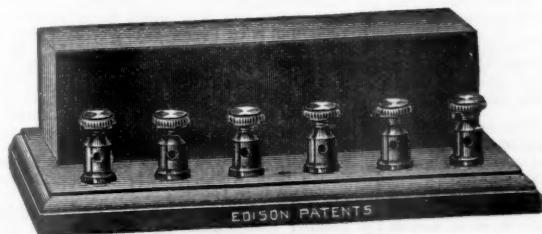


Fig. 5.—The Resistance Box.

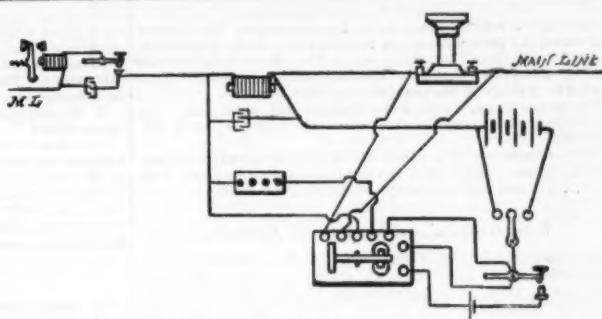


Fig. 6.



Fig. 7.



Fig. 8.



Fig. 9.

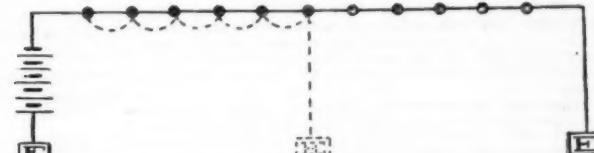


Fig. 10.

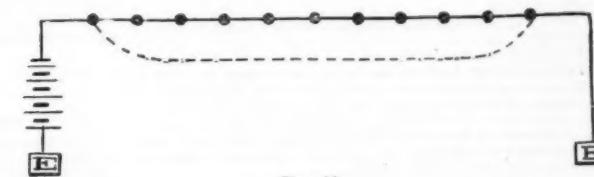


Fig. 11.

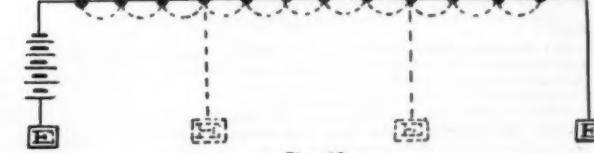


Fig. 12.

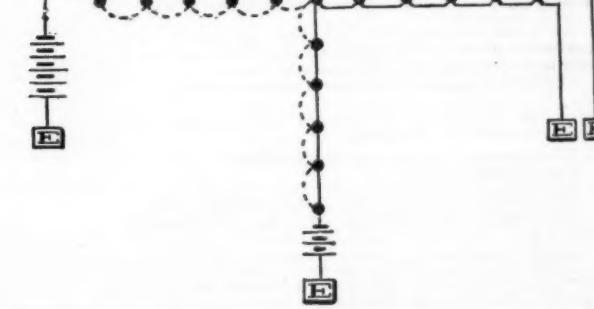


Fig. 13.



Fig. 14.

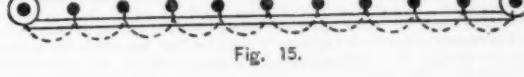


Fig. 15.

THE EDISON PHONOPLEX.

from what he was 23 years ago. In conclusion, Mr. Depew welcomed the Brotherhood on behalf of the New York Central, and said that if anything was lacking them if they would send up word to the Grand Central Station it would be attended to if it lay in the company's power.

The proceedings, which were interspersed with music by the Seventh Regiment Band, were closed with prayer by Dr. Talmage.

The business sessions, which are held with closed doors, according to the rules of the Brotherhood, began in Lyric Hall on Oct. 21, and will probably continue about 10 days.

Roadmasters' Association of America.

This now well-established Association held its fourth annual convention in St. Louis, Oct. 12, 13, 14 (its previous meetings having been at Niagara Falls, Chicago and St. Paul), some 130 members out of its total membership of some 360 being present. In these totals are included 77 new members who joined at this convention. President J. Burnett (Chicago, Rock Island & Pacific) presided; Vice-President J. W. Craig (Charleston & Savannah), Secretary John Sloan (Indiana, Bloomington & Western), and Treasurer Thos. Adamson (Ohio & Mississippi), were also present.

Mr. S. W. Cobb, President of the Merchants' Exchange, welcomed the members to St. Louis, in the unavoidable absence of the Mayor, his address being responded to by the President.

Chairman Preston, of the Committee on Foot Guards for Frogs and Switches, reported that all the members of the committee but himself deemed that foot guards were of little account, and that a road was better off without them. He therefore asked that the committee be discharged and a new one appointed, to report the following day. On protest by Mr. CRAIG against the subject being so lightly treated, he submitted the following:

MINORITY REPORT ON FOOT-GUARDS FOR FROGS AND SWITCHES.

The Chairman of your Committee, to whom was referred the subject of foot guards for frogs and switches, would respectfully report:

That he has given this subject the fullest possible investigation, consistent with his other duties, and find the following facts:

There are but two systems of blocking frogs, etc., which can be said to be in use to any great extent: one is the use of "plank wedges" familiar to all railroad men, and occasionally though not generally in use. The other is the system known as the "Hart foot-guard," with the exception of the use of cinder filling between the rails, in vogue upon one or two roads. Your Committee believe that all the other devices have failed to meet practical requirements; and in many cases have been discarded.

The plank wedges serve well enough as a protection, when they can be kept in the track, but their tendency to displacement, and injury by the flanges splintering them, and the difficulty in fastening them securely in all openings, for instance in the opening of plated frogs, in spring switches and frogs, and where ties are not in a position to spike them to, are so great that we doubt if this system can ever be brought to a general adoption. In fact many roads which have given these wedges a thorough trial have entirely discarded them on account of the impossibility of maintaining them in position, and claims are made that there is danger of derailing trains when these blocks are loosened from their places.

The system known as the "Hart foot-guard" now somewhat generally in use among western and also a number of eastern roads, your Committee finds, has given much more general satisfaction and can be supplied at a cost as follows:

For two-way stub switch, including frog and guard rails, complete	\$1.25
For single-throw split switch, including frog and guard rails, complete	1.50
For three-way stub switch, including frogs and guard rails, complete	2.75

This guard can be placed and kept in any and all openings in the track where the foot can be caught, except at ends of frogs where splices and bolts interfere; is no obstruction to the flanges of the wheels; can be permanently and securely fastened to the rails with $\frac{1}{8}$ in. carriage bolts of the proper length; causes no danger of derailing trains, and in its introduction and maintenance for a term of years is probably less expensive than the "plank wedges."

One member of your Association has had this guard in use in the track under his charge for five years, with less trouble than that which wedges formerly caused him. And upon a line of 1,300 miles in extent no accident of this character has happened in that time, where these guards were properly adjusted.

Your Committee finds that some 25 different roads have already secured the right to use this guard, and on many of them it has been generally introduced.

In conclusion, your Committee would report:

1. That, in view of the frequency of these frog accidents, and the fatality usually attending them, they believe it to be the duty of the Association to use its influence toward their prevention so far as possible.

2. That they believe the Hart foot-guard to be the best known practical protection against these accidents that is now in use, and that if generally used their number would be greatly diminished.

3. We would recommend the adoption and use of this guard by all railroads, as the most practical means of protecting their employés from this class of accident.

The Committee on Elevation of Curves then reported as follows:

REPORT ON ELEVATION OF CURVES AND GUARD-RAIL BRACES.

1. What should be the elevation per degree for a speed of 30, 40 and 60 miles an hour?

Would recommend as a general elevation $\frac{1}{4}$ in. per degree for a speed of 30 miles an hour and under, and 1 in. per degree for 40 miles an hour and over, not to exceed ordinarily a total of 6 in. An occasional deviation from the above may be admissible when extraordinary circumstances make more than total of 6 in. an absolute necessity, in which case 8 in. should never be exceeded. This excessive elevation should be on a level curve if on single track or on a descending grade if on double track, to permit the proper movement of freight trains.

2. Best method of elevating for change of curvature in reverse curves?

Began at the point of reverse and flatten both curves by throwing the track toward the inside of the curves for a distance about equal to $speed \times degree of curve$, assuming speed at not more than 40 miles an hour (see preceding part of this report), and being careful to have curvature gradually increase and run into regular alignment of curve without abruptness. Apply a string whose length is equal to speed plus one-half itself around and beyond the flattened end of the curve and measure the middle ordinates for the purpose of correcting the alignment. Continue to throw the track until a regularly increasing middle ordinate is obtained; then bring the track to a perfect level at the point of reverse. Again apply the string from the point of reverse, measuring the middle ordinates as before, and elevate the outer rail at

each point where ordinate was taken, a distance equal to the middle ordinate at that point. In this way a regularly increasing elevation can be obtained for a regularly increasing curvature. The curve beyond the flattened approach should be elevated in the same manner as the approach.

3. Should guard-rail braces be used on curves; if so, when and where?

Guard-rail braces should be used only on sharp curves of about 6 degrees and upward, or where the general condition of the cross-ties is not always good and traffic heavy. And when used should be placed at both rails, directly opposite and at least three braces to a rail (the exact number depending on circumstances), and spaced evenly, so as to preserve the uniform alignment and gauge of the curve.

D. H. LOVELL, |
THOS. ADAMS, | Committee.
J. W. CRAIG, |

In discussion the usual difference of opinion was developed. Mr. ALAMSON said that his practice was an inch to a degree, not exceeding $\frac{1}{4}$ in. to a 7 degree curve. He found this sufficient for speeds from 40 to 60 miles an hour.

Mr. ADAMS reported an elevation of $\frac{1}{2}$ in. to a 4 degree curve. Had discovered no irregularity in wear from this elevation. Put his guard-rail braces on the inside.

Mr. CAFFREY thought that the report thoroughly expressed his sentiments. There can be no cast iron rule for elevating curves. There are times when the elevation of an inch to a degree on a slight curve is not enough. Did not think that a curve should be elevated more than 8 in.

Mr. LARR puts his guard-rail brace on low side of curve. Had an engine derailed when brace was on high side, and was satisfied that he would always have had trouble if he had not made the change.

Mr. SHEA said that he had been an advocate of low elevation all his life, and an experience of 30 years has proved the practicability of his opinions.

Mr. PRESTON differed a little from the report of the committee. He elevates $\frac{1}{4}$ in. per degree for a 45-mile speed, and 1 in. for 60 miles an hour. Elevates 50 ft. for each degree from end of tangent. Can hardly tell when a train strikes a curve on his road. Has no curves over 7 degrees. Did not use guard-rail braces on anything less than a curve of 7 degrees, and then he used three to every 30 feet of rail.

Mr. JORDAN believed in 1 in. per degree, up to 6 degrees, for anything above 45 miles per hour. Elevating a curve alone does not insure a good riding curve. The approaches must be correctly run in with gradual increase of curvature. When he took charge of the Eastern Division of the Michigan Central he found plenty of curves from 3 to 6 degrees, some of them reversed or nearly so, with but 200 ft. of tangent between them and none of them compounded at the end. These he immediately compounded by the eye. Some of them he threw from 1 to 2 ft. at point of curve and one of them was thrown 2 ft. 10 in.

An invitation was then announced from the Elliot Frog & Switch Co. to visit the Exposition, which was accepted by the members, tickets being furnished by Mr. Elliott. An invitation was also accepted from the St. Louis Bridge & Tunnel Co. to inspect their works.

Mr. CRAIG remarking that the rails on this bridge creep from 12 to 14 in. every 24 hours, and he thought there was talent enough present to have the creeping stopped.

Adjournment was then had until 8:30 Wednesday.

WEDNESDAY'S PROCEEDINGS.

The standing committees appointed the day before on the questions of foot-guards and elevation of curve reported as follows:

REPORT ON FOOT-GUARDS.

Your Committee appointed to review the communications submitted to your regular committee on foot-guards would respectfully submit it as their opinion that some kind of a foot-guard is desirable, and that from the best of our information and belief we think that the Hart foot-guard is the best that we know of at the present time, and would respectfully suggest that the Association recommend the same.

R. R. HOUGHTON, |
C. E. JONES, | Committee.
F. X. GALARNEAU, |
S. L. SWINNEY,

REPORT ON ELEVATION OF CURVES.

Your Committee appointed to report on the question of elevation of curves would respectfully recommend the adoption of the report of the committee on that subject read at the first session of this convention.

R. R. HOUGHTON, |
C. E. JONES, | Committee.
F. X. GALARNEAU, |
S. L. SWINNEY,

Animated discussion followed the report on foot-guards. While the majority were of the opinion that some kind of a foot-guard was desirable, the recommendation of any particular kind was objected to. The association finally accepted the committee's report, striking out specific mention of the Hart foot-guard.

The next committee report was the

REPORT ON BROKEN VS. EVEN JOINTS.

Your Committee would respectfully report that the question of either "broken" or "even" joints depends upon the degree of excellency in which the surface of the track is to be maintained. Where there is but little attention paid to the importance of even fairly good surface, or where labor or material is withheld, whether from real or imaginary economy, with consequent detriment to the track, or where the nature of the road-bed or ballast makes it almost impossible to maintain good surface, the "even joint" is in all probability the better. But for good track, with good conditions, and with proper interest on the part of the proper officer, and with fair but by no means extravagant expenditures for track labor, etc., the "broken joint" is the standard joint.

Respectfully submitted, M. PHILBIN,
JAMES SLOAN, | Committee.
D. H. LOVELL,

Mr. CAFFREY disliked even joints, and thought broken ones decidedly preferable. He had observed tracks both east and west, and never saw one with even joints equal those of broken joints, whether with good or bad foundations.

Secretary SLOAN favored even joints. He considered them the best for track laid on prairie soil.

Mr. ADAMSON was of the opinion that for an indifferent track the square joint was the best. It was less expensive to repair and easily maintained. He sorted rails for length and put them in even. Thought he would like the broken joint on a perfect road-bed.

President BURNETT wanted to know why an even joint, if best for a poor track, was not equally good for a good one, and vice versa with broken joints. He had never used broken joints, but they make less noise if the bolts get loose.

Mr. GRACE said his road preferred square joints, except where they have old chairs and sand ballast where they use broken joints. Has had a long experience with broken joints, and at one time used to favor them, but found he was mistaken. Agreed with Mr. Adamson in regard to the excellency of broken joints. Uses the 40-in. angle bar.

Mr. CAFFREY remarked that the object to be attained was the avoidance of low joints, and this result could be best ob-

tained by the broken joint. On his way to this convention he rode a whole day over a track with square joints, and he felt more tired than if he had ridden two days over a track with broken joints. Could feel the wheels strike the rails every time. In reply to a question he said that he is using on his road angle-bars and the ordinary fish plate.

Mr. HAYWARD had some experience with broken joints, having had some 40 miles equipped with them for 18 months. When he took charge of it he could not keep joints up in wet weather, the road being a mud one, and the track could not be kept in line. He changed the track to square joints, and has not had near as much trouble to keep them in condition. Never heard of a train being derailed where both joints were low. The weight of his rails is 66 lbs.

Mr. PERRY uses broken joints except 10 miles, which he laid with square joints for experiment. Finds the latter harder to keep in repair than the broken joints. The bolts get loose more easily. Uses stone and gravel for ballast, and has some 75 ft. to the mile grades.

Mr. JONES thought broken joints superior on any foundation, whether sand, mud or gravel. Changed from square to broken joints about 18 months ago, and uses a 66-lb. rail.

Mr. HAWKINS had some experience with broken joints.

Up to six years ago used them exclusively, and since that time has had experience with both. Believed that with mud ballast even joint was the best on straight line. When joints were depressed together, the motion was that of a spring instead of a jerk, as is the case with broken joints.

Preferred the latter, however, with good ballast.

President BURNETT finds that the creeping of his track makes even joints very uneven. The rails, too, creep unequally, the south rail creeping about two feet to one of the north rail.

The sense of the Association on this question was then de-

cided to be expressed in the report of the committee, and the convention listened to the

REPORT ON GUARD RAILS.

1. We recommend for the best interests of all concerned, that guard rail for all purposes on main tracks should be 15 ft. long and should have 9 ft. of straight rail nearly parallel with the main rail; the center of the guard rail should be 6 in. ahead of the point of the frog, and the straight part of the rail should be $4\frac{1}{2}$ ft. each way from the point.

2. Commencing 2 ft. 6 in. from each end of the guard rail we recommend a regular curve, with a radius of 3 in., which leaves a flange way at the ends of the guard rails $4\frac{1}{4}$ in. We would recommend in using steel guard rails that $\frac{1}{4}$ in. be planed off from the base of the inside of guard rail for spiking space. We also recommend that three sections of filing be used between main and guard rail, as shown in tracing, that it be held to its place by bolt through both rails. This kind of a guard rail we would recommend for all kinds of frogs and in all places on the main line. But for yard purposes we recommend a 12-ft. guard rail with a regular curve of 20-ft. radius, as shown in tracing and secured in same way as main track guard rail.

G. R. CAMPBELL, | Committee.

C. E. JONES,

The discussion amounted to little, and the question was carried over to the next annual meeting in charge of a new committee.

REPORT ON STANDARD TRACK.

Your Committee appointed to report on the following queries, respectfully submit the following:

1. What should be the roadmaster's aim; and are railroads getting the best possible return for expenditures on track repairs?

2. What have you to recommend in the way of improvements at little or no additional cost?

1. The roadmaster's aim should be to have—1. Good drainage; that is, ditches wide and sufficiently deep and invariably clean. 2. Cross-ties of uniform length and properly spaced. 3. Surface at all times at least fair and splice bolts tight. 4. Invariable and careful use of level board in raising track. 5. Uniform elevation of curves and careful alignment of both curves and tangents. 6. Neat and clean appearance, freedom from weeds as far as the ditch line and removal from the right of way of old cross-ties and other rubbish which disfigure the roadway and promote untidiness. 7. System as to time and manner of doing work and also thoroughness in same.

2. Your Committee would recommend an annual track inspection of roadmaster's on superintendents division by the roadmaster and foreman of that division, and also an occasional trip over part of the division by track foremen, separately, during the summer months. Would also recommend that more attention be paid to the instruction of present and prospective foremen in the way of general information pertaining to maintenance of way; and that roadmasters themselves seek an opportunity to see what others are doing productive of good results.

D. H. LOVELL, | Committee.
JOHN DOYLE, | Committee.
GEO. E. CAIN,

THURSDAY'S PROCEEDINGS.

Discussion of the above report being in order, Secretary SLOAN thought it conformed a little too much to Pennsylvania Railroad practice. It was not always possible to keep tracks in condition desired, as the assistance obtainable had a good deal to do with it. Perfect drainage, however, was of prime importance on a well-kept road. This matter properly attended to remedied a score of evils. The right of way should also be kept clean, and here again came in the question of limited help. Believed emphatically that no trackman should do any work without track level.

Mr. GROVE thought the instruction of foremen a most important matter, and always made it a point that his subordinates understood exactly what he wanted. Sometimes the fault is with the roadmaster in not making himself clear.

Mr. PERRY believed that too much attention could not be paid to track drainage. His division runs through a rocky country, and it was not always possible to widen ditch as desired. Has some ditches not over 2 ft. from the ends of the ties. Used his old ties for fuel and station purposes. Finds that he has better results from personal interviews with his men than by writing to them.

Mr. JONES considered the keeping of clean ditches of more importance than even depth. Clean station grounds is also a requirement enforced on his road. Endeavors to pile old ties every evening, and under no circumstance allows them to remain unpiled longer than a week. Makes his men pay special attention to keeping splices tight. Has considerable second-hand steel on his division, and with the various kinds of joints has some difficulty in the matter of tight splices. When he finds a foreman repeatedly neglecting to use track level he discharges him. The best eye could not equal the level. Endeavors to spend as much time as possible with his men.

Mr. ADAMS believed depth of ditches to be of more importance than width. Ditch about 6 ft. from rail, with slopes about $\frac{1}{2}$ to 1.

Mr. SHEA said that his foremen were furnished with a book of printed instructions on track affairs. In addition, the managers of his road took the roadmasters over each division twice a year. This enabled them to observe what their fellow-workers were doing. The section foremen were also taken over their own division for the same purpose. His road runs through a rocky country and consequently his

ditches are not as good as he would like. Cleans some parts of his road twice a year, which is a very expensive proceeding.

Mr. MCGUIGAN wanted to know how to keep a perfect road-bed with two or three men on a section. Thought locality had much to do with best method of maintaining track.

Mr. LINSLEY believed that the railways did not pay enough attention to securing good trackmen. No inducement was held out to an intelligent young man to devote his time to track matters.

Mr. CAFFREY was emphatically of the opinion that the railroads are getting the best results for the money spent on track labor. There could be no doubt but that the section men earned all they received from the companies. There was also no doubt but that it would be more economical for the railways to spend more money on track work.

Mr. CRAIG then gave a résumé of the perfect system which his road, the Charleston & Savannah, has adopted for the education of foremen and maintaining right of way. These rules were published in full in the *Railroad Gazette* of Aug. 20, 1886, and have often been previously noticed.

The convention then adopted a resolution approving the report of the committee, and the formal discussions of the convention came to a close.

The following officers were then unanimously elected:

President, J. W. CRAIG (Charleston & Savannah), Charleston, S. C.

First Vice-President, C. E. JONES (Chicago, Burlington & Quincy), Beardstown, Ill.

Second Vice-President, J. H. PRESTON (Chicago, Rock Island & Pacific), Des Moines, Ia.

Secretary, D. H. LOVELL (Pennsylvania), Renovo, Pa.

Treasurer, THOMAS ADAMSON (Ohio & Mississippi), Lawrenceburg, Ind.

Member executive committee for three years, S. L. SWINNEY (Wabash, St. Louis & Pacific), Bement, Ill.

President Craig acknowledged the honor conferred upon him in brief speech, expressing his interest in the Association. Vice-President Jones also made a few remarks. Ex-President Burnett was warmly thanked by the association for his unceasing labor in its behalf.

Votes of thanks all around were then passed and the convention adjourned *sine die*, to meet in Cleveland, O., Tuesday, Oct. 11, 1887.

Among the excursions were a visit to the Merchants' Exchange and to the Exposition by invitation of the Elliot Frog & Switch Co., to the St. Louis Bridge, to the works of the Elliot Co., where the convention were entertained at luncheon and a carriage drive about the city.

Exhibits were more numerous than at any preceding convention, among them being exhibits by the Kalamazoo Railroad Velocipede Co., the Sheffield Velocipede Car Co., the Verona Tool Co., the Weir Frog Co., the Dodson Nut Lock Co., the Brush Interlocking Bolt Co., the Deane and Hooker Colville Steam Pump Cos., the Vulcanized Fibre Co., the Ajax Forge Co. and others.

Discussion of the Interchange Rules.

The regular meeting of the New England Railroad Club was held in Boston, Oct. 13, President Marden in the chair.

Resolutions upon the death of Mr. N. W. Talcott were accepted and placed on file.

The President announced as the subject for discussion the interchange of cars with special reference to the inspection of cars at interchange points, the defects in ladder rounds and handles, defective brake attachments, gauge of wheels, defective running boards, etc., and how far it is possible to remedy these defects. He said that within the past few years the subject of inspection has grown almost beyond our apprehension, and dwelt on the importance of good inspection.

By suggestion of Mr. ADAMS the rules were taken up *sporadically*. He thought the great difficulties at different points of inspection had been, hitherto, misinterpretation of the rules, or different constructions put upon them by different individuals.

Rule 1: That foreign cars should have the same care as to oiling and packing as home cars, was passed as plain enough.

Rule 2: CARS MUST BE DELIVERED IN GOOD RUNNING ORDER, AND RETURNED IN AS GOOD GENERAL CONDITION AS WHEN RECEIVED.

Mr. ADAMS: What is meant by "delivered in good running order?"

Mr. LAUDER read a circular addressed to the car inspectors on his road in July last, giving instructions perhaps as plain as any that could be given in regard to car inspection. A large amount of leeway has to be given the inspector, and much must be left to his judgment. No rules could be devised applicable to all cases. Certain things are plain enough, as, for instance, a draw-bar with defective rigging, a loose wheel or a burnt journal; and for anything of that kind we, of course, reject a car. But the question of what constitutes a safe truck frame may be a perplexing one, and others of the same character are constantly arising.

Mr. ADAMS thought that Rule 2 should read that cars must be delivered "in good safe condition," rather than "in good running order."

Mr. LAUDER: A short time ago we rejected a car because it had no brake. It was claimed by the road that it came from that it was in good running order. We took the ground that it was not safe for our trainmen, though it might be safe to run on the track. I believe that the laws of the state require every car to have a brake.

My understanding of the card system is that it is to be used in case of defects that do not render the car unsafe for trainmen or on the road. A car with the roof ripped a little would be safe to run, and it would be proper to put a card on that car, agreeing to receive it back, but if the draw-bar or draw timbers were ripped off a car I would decline to receive it, even with a card upon it.

Mr. CHAMBERLAIN: I think the rule is all right. I take the ground that a car is in good running order when it has a good brake, whole wheels, the ladder-irons in good shape, where in short it is safe for the trainmen, and not liable to be derailed. Good running order means that, and I don't think it means anything else. If a car was delivered in unsafe condition it would not be in good running order.

Mr. ADAMS: I believe the rule means in good running order throughout; but others think differently. When the question is raised the safety of the trainmen is not considered at all, and when the rules were constructed I think no attention was paid to this point. Of late years this matter of the safety of trainmen has come up, and now this is looked upon as a very important consideration, and therefore I think the rule should express the idea that the cars should be in safe condition.

Mr. SOULE: Rule 2 is so general in character that it does not seem to me of much practical use. If these rules for the guidance of inspectors could be made so plain and definite as to take off some of the responsibility which now attaches to the inspectors, it would be an advantage, and if they could then be printed and hung up where they could be readily referred to by them, many difficult points which they are now called upon to decide would be more easily of solution.

Mr. LAUDER: It seems to me that the rule is all right as it is, although I admit that some claim that the rule means a car that is safe to pull in a train is a car that is in good running order.

ring order. I don't see how the language can be misconstrued as it now reads.

Mr. LEIGHTON: It seems to me that Rule 2 is simply a declaration that the cars shall be delivered in good running order, and that the following rules are to explain what good running order is. A car in good running order is all that you want, and it seems useless to say any more about it. The only trouble is that men interpret the rule differently as to what constitutes good running order.

Mr. WHITNEY: A car may be in good running order, and you may be able to haul it in a train, but it may not be in safe condition for freight. I don't know whether it may be refused under those conditions or not. But there are other defects than those mentioned in Rule 3 for which a car should be refused; but by inference an inspector might think that was hardly the thing, and might let it go, while another road might refuse it. So I think Rule 2 is all right, and I would amend Rule 3 to cover what is necessary.

Mr. COUGHLIN had seen freight cars heavily loaded, with levers and brakes striking the frogs and rails, which were very dangerous. On the other hand, the same cars light are perfectly safe: the brakes above the rail.

The PRESIDENT: I should say that Mr. Coughlin's inspectors ought to have stopped the cars in that dangerous condition.

On motion of Mr. ADAMS it was recommended that Rule 2 should be amended so as to read, "Cars must be delivered in good running order, and in safe condition for trainmen, and returned in as good condition as when received."

Mr. SOULE: Before the discussion on Rule 2 is closed, I wish to call attention to this point: It says that cars are to be

"RETURNED IN AS GOOD CONDITION AS WHEN RECEIVED."

Upon what grounds is the condition of the cars to be determined? How are we going to ascertain the condition of the car when received? By the appearance of the car, or from memory, or from a record, or upon what ground?

Mr. WAITT: I have noticed during the past year several cases among our cars, where some of them were delivered to the Albany road and by that road to the New York Central in good condition and then went West, and after six months or a year were returned by no means in good condition. The Albany road was asked to receive them, and we were asked to receive them before they would. Now, had that road a right to require the New York Central to repair those cars and return them in as good condition as when received? What is the interpretation of the rule in such a case?

Mr. ADAMS: I think that is a point well raised, and it is a point we have had a good deal of trouble with. My understanding of the matter is that cars shall be returned to the road owning them or to the road first delivering them in as good condition as when received, allowing for natural wear and tear, natural service. If they have been broken in any way—sills broken, doors knocked out, a wheel broken—that is breakage, not natural wear. As I understand, that refers to the natural service of the car, for which all roads get mileage to meet that liability.

Mr. LAUDER: Suppose a car owned here is gone off for a year on other roads, and when delivered from here the wheels are in good condition, but when it returns one or more of them is all worn out and not safe; of course, it is for the road owning the car to make the wheels good, because it has been worn out in service, and it is fair to presume that the road has received its mileage for what the car has run on foreign roads. If a car is broken, I agree with Mr. Adams that it must be put in proper condition before it is returned, according to the rules laid down. If the ladder-rounds were broken or the side castings were hanging by the gills, in a car belonging to our road, I should want these things fixed before the car came back.

Mr. SOULE: The trouble connected with the returning of cars "in as good condition as when received" does not apply to palpable defects but to obscure defects, which have existed for years perhaps. It seems to me when an inspector discovers defects which are palpably old, the better way is for him to return the car home. What are we going to do about these obscure defects which are not discovered at a glance? Sometimes a road gets into a trap on this account.

The PRESIDENT: I would like to ask Mr. Adams if a car was offered with broken sills over the transom, an old defect, whether he would receive the car, and make the repairs himself?

Mr. ADAMS: If the car had been gone a year or two, I should conclude that that car had been bumped pretty hard some time, if sound when it went away, and that it had not been fairly dealt with. I think it is the duty of inspectors to find out those defects. If we should receive a car in the condition the President mentions, without protest, and we attempted to deliver it again, I should expect it would be stopped on our hands, if the inspectors on the other road were sharp, and we should expect to put that sill in again. We have asked the New York Central to send all our old cars home, worn out from natural wear and tear; we do not ask them to send home broken cars. Mr. Soule speaks of defects not readily observable; not readily found. It is his misfortune if he does not find them; he must look out for them. If somebody else finds them on him he will have to bear it.

Mr. SOULE: If it is self-evident that that sill was broken when the Boston & Albany road received the car, broken long before, why should that road stand the repair, when the rule says the cars are to be returned in good condition? If this business is to be founded on a record of defects, it ought to be understood.

Mr. CHAMBERLAIN: The card arrangement provides for all that, and if the inspector doesn't find these things the road must stand the loss.

Mr. LAUDER: I think so. If Mr. Adams' inspector at Albany receives a car with defective sills, and he deems it safe to run to Boston and back, he should require a card stating the condition of the sills. Then when the car comes back there is no question about its being received. Meantime if the sill pulls out, Mr. Adams can repair it and charge it to the road which put on the car.

Mr. ADAMS: If we should find a car of ours on the New York Central with rotten sills (the end sill may get decayed so that you would not see it, covered by the ceiling). If it should break, and clearly from its own decay, I should take the car home and say nothing about it. I wouldn't be so unfair as to have another road repair that car, all worn out that way. We have always taken back our cars from the New York Central road when they were evidently rotten from decay, and they have done the same. But when a car comes to us with sound timbers broken by collision or otherwise, though it may have been broken six months, and we don't know who did it, we look to the road which delivers it to us, the presumption being that they are responsible, because they took it. If they have not inspected it closely and allowed it to pass, that is their misfortune.

"WHEELS WORN OR SLID FLAT, EXCEEDING 2 1/2 IN. IN LENGTH OR DIAMETER."

Mr. SOULE: What constitutes a "flat" wheel—one arbitrarily flat, that can be measured with a wooden rule, or any wear from the original circular surface. There is a difference of opinion among inspectors as to what is a flat wheel.

Mr. HITCHCOCK: I have never yet learned what is the opinion of our master car-builders, as to the size of a flat that should destroy a wheel. If we take a wheel that is 2 in. flat and run it, and slide it to 2 1/2 in., have we ruined that

wheel, or was it ruined when it was slid 2 in. flat? If we receive a car with a wheel that has been slid 2 in. flat, and it is ruined then, and slide it to 2 1/2 in., we should be exempt from paying for it.

Mr. COUGHLIN: I should say a wheel was ruined when it slid 2 in., if it was a straight flat, not an oval flat. My experience leads me to the conclusion that a wheel that has been slid hardly ever gets caught again in the same place on the rail, but is caught by the brake at that place and will make another flat spot. You will find that a great many wheels have flat spots all around, simply from being caught by the brake, because it has got a flat space to catch on to.

Mr. HITCHCOCK: If a wheel comes to your line that has been slid 2 in. flat, and you catch it in another place and slide it to 2 1/2 in., have you damaged the wheel?

Mr. ADAMS: The rules provide that if we flatten a wheel to 2 1/2 in. we are responsible for it, and we must stick to the rules until they are revised.

Mr. LAUDER: I think the only thing to be considered in Mr. Hitchcock's proposition is whether the limit of 2 1/2 in. is too great; whether 2 in. does not ruin the wheel as much as 2 1/2 in. does. I don't think a flat place will catch the wheel in the same place again. If I see a wheel with three or four flat spots on it caused by sliding I think the leverage of that car is wrong. I think the rule is right as it is. A flat spot 2 in. in length on the periphery of a 38-in. wheel is not a very large spot. If wheels were thrown out for that we should throw out thousands now running.

The PRESIDENT: We have been following up the flat wheels under passenger cars recently. We require the inspector to report every wheel flattened, with the name of the engine, the train number, the engineer's name and the date, and we test the wheel and try to reach the difficulty, and we have reduced the injury to wheels in this way very largely. An inspector can discover an inch flat in a wheel under a car, and the flat place will continue to grow, but the wheel will not catch in that flat place, it will catch on the largest diameter of the wheel.

Mr. LAUDER: How do you account for that spot growing?

The PRESIDENT: By the wheel sliding a second time in the same spot. In all the wheels we have tested we found them out of round, and the brake invariably catches on the largest circumference of the wheel. I have never taken out a single pair of steel wheels flattened, except the Cooper elastic wheel. We don't have any trouble with flat wheels.

Mr. SOULE: The measurement of these flat spots is what troubles inspectors. What constitutes a flat wheel has proved a vexatious question. Two inches started will presently show an abrasion close on to 2 1/2 in. Is that to be considered as constituting a flat wheel, if it rocks in the centre, and is not really flat?

Mr. HITCHCOCK: I don't want to lose sight of the idea of determining what ruins a wheel, how large a straight slide it must have to be ruined.

Mr. WHITNEY: The rule defines distinctly what a flat is. It must be 2 1/2 in. long. I take it, it means flat, not oval. If that is too much, let the club say so.

Mr. HITCHCOCK: What I want to ascertain is, if a wheel is 2 in. flat when you receive a car, and you make it 2 1/2 in. flat, when you return that car are you obliged to put in another wheel, or who is responsible? I claim that it was ruined when it was delivered 2 in. flat.

Mr. ADAMS: If I had that opinion I should require a card put on that car wheel when I received it. That would rather fasten the flat where it belongs.

Mr. CONEY: Did anybody ever see a flat spot 2 1/2 in. long either way on a wheel? I mean dead flat, so that a straight edge would touch the whole length.

The PRESIDENT: I have seen them 3 in. In regard to slender wheels, if under the rule a wheel be rejected that is 2 1/2 in. flat, I should consider that if I received a wheel 2 in. flat and flattened it to 2 1/2 in., I should take it out. If we could settle how the flat spot is to be measured, it might be an advantage to inspectors.

Mr. SOULE: I never saw a worn flat wheel 2 1/2 in. flat. This is misleading as the rule reads.

Mr. ADAMS: I have seen lots of them.

Mr. GRIGGS: On taking out flat wheels, and finding them worn out of true, is the company who receives them obliged to make them good, or is the company that fitted them up to pay for them?

Mr. ADAMS: If one of our wheels is bored out of true, and it is clear that it slides in consequence of it, I should say that we ought to be responsible, if it is evident that the wrong boring is sufficient to cause that; but if it is slightly out of round, say not more than 1/8 in., I should say the party who used it was responsible for the flat. Perhaps, however, it would cost less to pay for such a wheel than to go to the trouble of finding out.

Mr. GRIGGS: I have found in most cases of this kind the wheels were new or nearly so.

Mr. LAUDER: I think the phraseology in the rule "worn or slid flat" should be changed. There is no such thing as a wheel worn flat. A wheel worn through the chill won't be flat, as I understand it. We all know what is meant by worn flat; it means worn through the chill, which causes what is called a flat spot. As every one knows what the word flat means, I don't know why we should change it, although, strictly speaking, there is no such thing as a wheel worn flat. I don't think there would be one case in a million where a wheel slid flat would be slid in exactly the same spot again. There is no occasion for its catching in that spot, though we find wheels catching in half a dozen places. I have seen half a dozen slid spots on a wheel.

The PRESIDENT: I think such wheels will be found to be round again. I think the reason that wheels catch in the same spot again is that they caught there the first time from being out of round; they were bored out of round (they are often not bored straight); the brake-shoe will catch on the smallest diameter of the wheel, as the larger diameter goes over. If we should say that it should be a straight measurement, that would settle the question.

On motion of Mr. LAUDER, it was voted that it be recommended to the Executive Committee of the Master Car Builders' Association, that clause A, of Rule 3 be changed to read as follows: "Wheels worn hollow, or having straight flat spots 2 1/2 in. in length, caused by sliding, shall be regarded as defective."

On motion of Mr. ADAMS, it was voted that the next regular meeting of the club be held on the second Wednesday of November, at 2 p. m., and that there shall also be an evening session.

Contributions.

The Use and Abuse of Freight Cars.

Western & Atlantic Railroad,
ATLANTA, Ga., Sept. 29, 1886.

To THE EDITOR OF THE RAILROAD GAZETTE:

I inclose herewith some tables bearing on the "Use and Abuse of Freight Cars," which have been very carefully prepared, and contain, I think, some very valuable suggestions:

I select 100 box cars for three months as the basis of my calculations, although figures were obtained from a much larger number of cars, and through a longer period of time,

but the figures for the three months stated held good, and are taken as an average. You will note that these three cars were in transit only 36 per cent. of the time, and were detained at stations 64 per cent. of the time, and yet they average 1,175 miles per month, or 38 miles per day, which is considered very good mileage for cars in general service. This suggests how easily the mileage of cars could be greatly increased if the unnecessary detentions were decreased. Suppose the ratio is reversed, and cars are in transit 64 per cent. of the time, and are detained at stations 36 per cent. of the time, we would then have cars earning 2,340 miles per month, or 76 miles per day. This would double our revenue from car mileage.

Private car companies appreciate these facts, and by owning special cars that are in great demand and are not detained an unreasonable time at stations, they are able to earn a much better profit on cars than railroads. These tables certainly prove that cars can be made to double their present mileage and allow 36 per cent. of the time for transfers, unloading, switching, etc. Railroads consider 35 miles per day as the maximum mileage for cars in general service, and yet this mileage is earned in only 36 per cent. of their time.

For some time great dissatisfaction has existed on account of the present mileage returns. The majority of roads complain that their cars are not earning sufficient mileage. Some advocate per diem rates, others daily interchange of movements and mileage reports, while others cling to the present bulk mileage system. I will not now in this paper attempt to champion either of these systems. The figures contained in these tables were evolved from the daily interchange of movements and mileage reports. Consequently they are not estimated but are actual figures.

Under our present system we have no absolute check on either the movement or mileage of a car after it leaves our road. Simply as a business proposition, all roads should have a check on both, but the most serious defect of the present system is the abuse of cars. After a car leaves your road it may earn 35 miles per day, or remain sidetracked for an entire month, and the owner of the car not be advised in time to prevent detention; and, under the present bulk mileage system, the actual mileage earned while absent is to a considerable extent simply a matter of speculation. Before car service can be perfected two things must be accomplished:

1st. Car service should be so improved that unnecessary detention at stations will be greatly decreased.

2d. Roads should have an absolute check on their mileage returns.

EUGENE C. SPALDING,
Car Accountant, Western Atlantic Railroad Co.

TABLE NO. 1.

Showing the number of days that 100 Western & Atlantic Railroad cars were on its own line; the number days off the line, the number of days in transit and the number of days detained at stations, during the months of October, November and December.

Months.	W. & A. R. R.	Number of days on line	Number of days off line	Total No.	Number days detained	Total No. days
					in transit	at stations
October....	1,340	1,760	3,100	1,108	1,992	3,100
November...	6,8	2,342	3,000	1,184	1,816	3,000
December...	9,6	2,144	3,100	1,062	2,038	3,100
Totals....	2,954	6,246	9,200	3,354	5,848	9,200

TABLE NO. 2.

Showing the mileage made by the above 100 cars during October, November and December over Western & Atlantic and foreign roads.

Months.	W. & A. R. R.	Mileage over foreign roads,	Mileage over both, or total	Mileage over Western & Atlantic
				W. & A. R. R.
October.....	35,258	69,301	104,559	
November....	27,491	97,883	125,374	
December....	31,030	91,023	122,653	
Totals.....	93,779	258,87	352,586	

TABLE NO. 3.

Average mileage made by the above 100 cars, per car per month, and per car per day.

Per car per month.	Per car per day.	Average mileage made by the above 100 cars, per car per month, and per car per day.	
		Per car per month.	Per car per day.
October.....	1,045	35 1/2 miles	
November....	1,253	41 4/5 ..	
December....	1,226	39 1/4 ..	
Average.....	1,175	38 1/2 ..	

The Proportions of Culverts.

MONCTON, N. B., Sept. 13, 1886.

To THE EDITOR OF THE RAILROAD GAZETTE:

In reply to "I. M. B." in your issue of Sept. 3, referring to dry masonry for box culverts, I would say that I do not believe dry masonry box culverts should ever be used where lime and cement can conveniently be had. I think a box culvert should be capable of carrying its fill of water, as an iron pipe would do, instead of allowing storm water to run through behind, to soften the bank and cause a washout.

In fixing the size of openings, I generally proceed as follows:

- 1st. Observe present openings on same stream, if any.
- 2d. Go where the stream is contracted and flowing fast and measure the sectional area.

3d. Inquire of the inhabitants whether they ever saw the stream carrying two, three or four times as much water.

From these measurements and this information I fix the size of opening.

If I should ever have a week or so to spare, I might use Maj. E. T. D. Myers' rule, but as yet I have not had the opportunity.

W. B. M.

[Unquestionably the custom of using dry masonry for culverts is a custom more honored in the breach than the observance, and it is fortunate that it is passing out. If indeed it may not be said that box culverts themselves are passing out in favor of iron pipes or arches. They are a constant provocative to too small water-ways, and the covering stones very often give trouble. If flat rubble or concrete arches of not more

than 120 degrees arc were more used for small structures, it would unquestionably result more satisfactorily in the load, and increase the cost little, if any; but the laying of any kind of masonry dry under a bank is a very foolish form of economy. It might almost as well be laid dry, however, as to leave it to the average contractor to furnish the cement. The true practice is to furnish him the cement and use plenty of it.—EDITOR RAILROAD GAZETTE.]

CHICAGO, BURLINGTON & QUINCY RAILROAD CO.,
CHIEF ENGINEER'S OFFICE,
CHICAGO, Sept. 25, 1886.

To THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of Sept. 10, 1886, in an article on "The Proportioning of Culverts," you refer to our tables of areas for iron pipe culverts.

This may be misleading as to practice on this road, unless it is remembered that the table is for iron pipes only, and then with certain heights of embankment and certain lengths of stone-paved aprons at the lower end of the pipe. These conditions are imposed with the condition understood that the location is such that, in case of an extraordinary rain-fall it is permissible temporarily to back up the water above the pipe culvert and thereby obtain a head.

With iron pipes, properly put in, it is perfectly safe, so far as the structure itself is concerned, to force the water through at a much more rapid current than it would be with masonry culverts, because with the latter, unless founded on rock, there is danger of undermining the foundations and thereby destroying the whole structure, while through an iron pipe there is no such danger.

C. G. S.

An Accident Prevented by Re-railing Safety Frcgs.

CLEVELAND, Oct. 13, 1886.

To THE EDITOR OF THE RAILROAD GAZETTE:

Your comments on the accident on the New York, Susquehanna & Western Railroad printed in your edition of the 8th inst., reminded me that a serious accident was prevented on our road by Mr. Latimer's device. The following is a copy of a letter written to him a few days after it occurred.

AUG. MORDECAI.

CLEVELAND, O., Aug. 6, 1886.

CHAS. LATIMER, ENGINEER N. Y., P. & O. R. R. Co.:

DEAR SIR: I am glad to be able to give you an account of the excellent performance of your re-railing apparatus at a bridge on this division a few days ago. We are rebuilding a deck bridge near Mantua Station, which is some 40 ft. above the water, and have built a temporary trestle which has short ties, to allow the masons to work, and not a very perfect floor system. Some days ago a car in a night freight train bound west was derailed by a broken brake beam. It ran about a quarter of a mile, when, on reaching your apparatus, it was immediately replaced, without, I believe, the trainmen knowing it was off. The wheels were something over a foot from the rail before being replaced. I do not question that your apparatus saved us from certainly a very expensive accident possibly attended with loss of life.

Yours truly,

AUG. MORDECAI,
Assistant Engineer.

Reform in Bridge Specifications.

To THE EDITOR OF THE RAILROAD GAZETTE:

I wish to congratulate you on the success that has already attended your efforts for simpler specifications and heavier, better and cheaper railroad bridges, for I saw in your last number that you already have one convert, and I dare say that before long you will have very many more, although most of them will not be willing to acknowledge it like Mr. Lindenthal. But if you will persist in the good work you have begun, I have no doubt but that your labor will bring forth abundant fruit in time. If in so short a time you can convert so eminent a bridge engineer as Mr. Lindenthal, what will you not be able to do in time?

I do not think it is anything against an engineer that he has at some time specified the engine loads that you so severely and justly condemn, for probably most engineers who have had charge of railroad bridges have been taken with the disease, and it is even possible that you. Mr. Editor, may at some time have had a slight attack, from which you speedily recovered. Even Mr. Lindenthal had it so badly at one time that he thought the way to obtain the strains in small bridges was to uncouple two engines from the tenders back them together, and then move them over the structure. I presume this is like whooping cough; there is a time when all engineers must have it.

It is well known, as Mr. Lindenthal says, that the bridge which would carry trains at slow speeds might be dangerous for fast express trains? Does not your record of bridge failures show that many times more bridges fail under freight trains than under express trains, these very bridges having been crossed by express trains at full speed only a short time before failure? In fact, have not nearly all bridges that have broken down done so under slow moving trains? I cannot call to mind a single instance of a bridge failure under a train moving at a high rate of speed, while I do remember a failure under a freight train moving so slowly that men could step from the caboose to the cross ties on the bridge with safety.

In regard to specifications of quality of material, it seems to me now as though it would be better to give manufacturers more choice than they now have in most specifications. It would be better only to specify that the materials should be tough, ductile, uniform in quality, and nearly free from crystals, leaving it to bidders to use iron or steel, and for them to state what the limit of elasticity and ultimate

strength should be, nor would I give the working strains per square inch.

Instead of these I would simply state that the working strain should never exceed a certain per cent. of the amount necessary to produce permanent set, or another per cent. of the ultimate strength, and that finished bars must stretch a certain per cent. before rupture.

For example, I would say that the working strain should never exceed 20 per cent. of the ultimate strength, nor 40 per cent. of the amount necessary to produce permanent set, and a finished bar should stretch not less than 15 per cent. before rupture. This would give manufacturers the privilege of using iron or steel, whichever they could use at the best advantage; but in their specifications they should state limit of elasticity and ultimate strength, and should be held as rigidly as possible to their own proposition. I would not specify qualities of iron that I would not get, nor grades of steel about which I know less.

In this way I think I would know more nearly what I was getting, and get more nearly what I was paying for.

* * *

THE SCRAP HEAP.

Railroad Young Men's Christian Association.

Sparks, issued by the Association at Milwaukee, gives the following summary of work done in September: "The attendance in the rooms for the month was 1,266; persons using baths and basins, 263; letters written in rooms by visitors, 68; letters received in rooms by visitors, 24; strangers directed and inquiries answered to, 83; personal calls made by the General Secretary, 127. Four open air meetings were held on the depot platform; four gospel meetings in the rooms; two mass meetings in two south-side churches, Sunday evenings, Sept. 12 and 26; four meetings in the rooms for bible study, with a total attendance of 1,267."

The report of the Association at Kansas City, Mo., for the year ending Aug. 31 shows an increase of membership from 235 to 495. The total receipts for the year were \$2,795, and the expenses \$2,774. The total attendance at the rooms during the year was 83,012. There were held during the year 155 religious meetings, 15 lectures and entertainments and 2 business meetings. Five funerals were conducted and the appliances for use in case of accident were called for 84 times. There were 979 visits made to shops, cabooses, etc., and 27 to men sick or injured. The library was enlarged by the gift of 700 volumes, and 70 periodicals are now on file in the reading room. A convenience much appreciated is the bath-room, which was used by 8,226 men during the year.

The Conductor and the President.

[Latest, revised and only authentic edition.] "I'm President of the road," nodding his head to the conductor as he came through the car collecting tickets.

"Pass, please."

"That's all right."

"Pass, please."

"Do you doubt my word?"

"Pass, please."

"You are insulting. I'll attend to you when I get home."

"Fare, please."

"This is insufferable."

"Fare, please."

"A new man ought to know his business better!"

"My orders are that every person who rides on my train must have a ticket, pay his fare or show a pass properly signed or be put off. Your pass or your fare, please—there's nothing in the regulations about any man's riding on his word."

"I'll discharge you at the end of this run!"

"For the last time, your pass or your fare, please. I'm on to your racket. The President of this road don't ride in the smoker of the regular train; he goes in his own private car."

"I've left my book of passes at the office, and the only money I have is a check."

"Then you know what you can do?"

"What?"

"Walk!"

And he did—ten miles to the nearest station.

"But he was only a boy!"

"Oh, no, indeed. He was the President of the road."

"Didn't that conductor know him?"

"He knew him too well."

"Did he get the g. b.?"

"No, he did not get the g. b."

"Why did he not get the g. b.?"

"Because he had got a better job on another road; this was his last run, anyhow, and he improved this providential opportunity to get even with the man who had made life a burden to him—that's all."—Detroit Free Press.

A Dog Which Could Not be Beaten.

Yesterday afternoon, as engine No. 6 on the Pittsburgh train had passed Four Mile crossing on its way to Belleville, a small dog jumped on the track and kept at a race with the train a distance of several miles. The engine finally ran him down, but his grit held out, and he would not surrender. The cow-catcher struck him, and it was supposed that he had been crushed to pieces until the train stopped at the depot in Belleville, when the dog coolly jumped out from the ashpans, where he had been riding about eight miles, apparently unharmed. Master Mechanic Timen took possession of the dog, named him "Accident" and refused to sell him at any price.—St. Louis Republican, Oct. 13.

A Lost Train.

A lost train is something new in railroading, but, nevertheless, a case occurred on the Eastern Division last Sunday night and the officials were unable to locate it, although the telegraph was called into requisition for that purpose. A freight train composed of time freight took the switch at Middletown before 7 o'clock that evening in order to let the Orange County express pass. After this a mishap occurred to a freight train which prolonged the other's time in the switch. It was calculated that it would take about an hour to right things and the gang in question concluded they might as well take advantage of the opportunity of gaining so much sleep. In a short time every man in the crew was in the arms of Morphus. The other freight got things to right sooner than expected, pulled out and proceeded on its way, leaving the gang with the train of time freight peacefully sleeping the sleep of the just. Trains thundered past east and west all night but the sleep of the tired crew was never disturbed. Messages passed back and forth all night between this village and Middletown and intermediate stations, but they brought no information in regard to the whereabouts of the missing train. It was not until old Sol began to peep over the Jersey hills that the men realized their position and then they began the second start for their destination, arriving here at 7:20 Sunday morning. Inquiry among Erie of

ficials at this place prove that the report is true in the main, but they deny that the train was lost and claim to have been cognizant all night of its whereabouts. The train took the switch as stated above, and the wreck at Southfields caused a complete block of travel, all freight trains being compelled to take the east-bound track to allow the first-class trains to proceed west. After the Orange County express, followed passenger trains 5, 8, 29, 49 and 43, and then the clearing of the wreck and moving the long lines of freight compelled the train in question to remain in the switch until morning.—*Port Jervis (N. Y.) Gazette*, Oct. 19.

Gold and Marble in a Road-bed.

The Marietta & North Georgia Railroad, which is reached via the Western & Atlantic Railroad at Marietta, is probably the only railroad in America, which, in addition to being ballasted a portion of the way with marble, also has its bridge piers made of white marble. Quite a "daisy" line one would say.

It is also the only railroad in America, probably, which runs right through a gold mine.

A funny anecdote is related in this connection of the line-men of the Western Union Telegraph Co., who were erecting telegraph poles along this road a short time ago for the purpose of extending the telegraph line from Marietta to the upper terminus of the road.

Arriving at the gold mine, they were just in the act of digging a hole for a post, when a brusque old countryman came up, and in a somewhat forcible manner notified them that they could not dig in that soil, as he had leased it.

Upon explaining to him their purpose, the countryman agreed to a compromise, which was to the effect that the telegraph folks were to dig the hole, and that he was to wash the dirt and that they were to divide equally the gold therein found.

The work of excavation accordingly commenced, and within a short time was done with, when the countryman, who had been closely watching the procedure, remarked to the telegraph man that the latter could "have every durn'd bit of gold which could be found in that dirt," as he would not wash it for the small amount he saw would reward him for his pains.—*Atlanta (Ga.) Constitution*.

A Singular Accident.

A correspondent of the *Philadelphia Ledger*, writing from Norristown, Pa., Oct. 19, says: "A singular accident occurred this evening on the Stony Creek Branch of the Reading Railroad, north of West Point station. As engine 456, drawing 93 freight cars, was rounding a curve the axle of the middle drivers broke. The left wheel immediately left the engine and ran parallel with the train for some distance. Frank McKernan, the conductor, was sitting on the platform of the tender. As the tender passed the wheel the latter, which was still traveling along the track, struck McKernan's legs and knocked him from his perch to the road-bed. By this time the connecting rods were broken and were tearing the machinery and cab to pieces with every revolution. The engineer, David Jones, stepped out upon the foot board when one of the rods struck him on the sole of his foot and knocked him headlong into a heap of ashes along the tracks. The fireman was scalded by escaping steam. No one remained to man the engine and the train thundered by West Point, the broken axle and connecting rods thumping and bumping the locomotive to pieces. After running about two miles the train came to a standstill, the locomotive standing on the rails and her machinery ruined. The injured men were made as comfortable as possible and brought to Norristown. None of them are hurt fatally. The road, being a single track, remained closed to travel for about four hours."

Not Appreciated.

There is a class of people which does not appreciate the improvements that are being made to the road-bed along the Erie Railroad. This class does not think that an improvement is being made, but rather that the company is working them an injury. The persons referred to are tramps, and they complain very bitterly that the new ties being put in are placed altogether too close. Their principal complaint, however, is against the stone ballast. This, they say, is terrible on their feet and a very productive source of bunions and corns. It is said that there is a movement on foot among them to boycott the road in the future, and patronize roads where the walking is softer.—*Paterson (N. J.) Press*.

TECHNICAL.

Locomotive Building.

The Mason Machine Works in Taunton, Mass., have just completed a shifting engine for the Boston & Maine road.

The Raleigh & Gaston shops in Raleigh, N. C., are building a new locomotive for the road.

H. K. Porter & Co. in Pittsburgh, during the last month shipped locomotives to Michigan, Georgia and Arkansas, and also to Cuba, the United States of Colombia and Venezuela, S. A.

The shops of the Pennsylvania Co. at Fort Wayne, Ind., are building 13 Mogul freight engines, for use on the Pittsburgh, Ft. Wayne & Chicago road.

The Roanoke Machine Works at Roanoke, Va., have received an order for 12 consolidation freight engines for the Norfolk & Western road.

The Car Shops.

The Ohio Falls Car Co. at Jeffersonville, Ind., which recently started up its shops, has a number of contracts on hand. In passenger car work these include 50 passenger and baggage cars for the Wisconsin Central; 30 passenger cars for the St. Louis & San Francisco; 15 for the Chicago, Burlington & Quincy; 15 for the Missouri Pacific; 4 for the Litchfield, Carrollton & Western, and 3 for the Portland & Willamette Valley. The freight car contracts include 300 for the Wisconsin Central; 200 for the Louisville, Evansville & St. Louis; 150 for the St. Louis & San Francisco, and 100 for the South Florida road.

The Pullman Car Works in Pullman, Ill., have taken a contract to build 600 coal cars for the Chicago & Indiana Coal road.

The Southern Car Works, in Knoxville, Tenn., have just completed an order for 6 dumping coal cars for the East Tennessee, Virginia & Georgia road.

The shops of the Pennsylvania Co. in Fort Wayne, Ind., are turning out 100 box cars a month for the company. They are at present running night and day.

The Roanoke Machine Works at Roanoke, Va., have recently received orders for 1,000 box cars for the Norfolk & Western road, and for 500 box cars for the New York, New Haven & Hartford road. The latter is the second order from the New Haven road in less than a year.

Bridge Notes.

The Keystone Bridge Co. in Pittsburgh has the contract for the new bridge over the Missouri near Kansas City, for the Chicago, Milwaukee & St. Paul road. The bridge is to have three spans of 400 ft. each.

The Phoenix Bridge Co. in Phoenixville, Pa., has taken the contract for the bridge over the Tombigbee River, at Jackson, Ala., on the Mobile & West Alabama road.

Mr. M. Lassig, of Chicago, has taken the contract to build

1,545 ft. of iron trestle in the approach to the new bridge over the Missouri, near Kansas City.

The South St. Louis Machine Works of Stupp Brothers are building a highway bridge in Forest Park, St. Louis, and have also contracts for several highway bridges in Missouri and Illinois.

Manufacturing and Business.

The Damascus Bronze Co. of Pittsburg has removed to its new building in Allegheny, and has now one of the finest foundries in the country. The foundry contains a large Siemens open-hearth furnace, with a capacity of 5,000 lbs. per hour, run by natural gas. This, it is claimed, is the first instance where copper is melted in an open-hearth furnace and casting poured direct from the furnace. The company reports a large increase of business during the past year, especially in its railroad contracts.

The Hartman Steel Co., in Beaver Falls, Pa., recently received an order for a number of its steel wire mats, to be used in the government buildings, Calcutta, India.

The Harlan & Hollingsworth Co. in Wilmington, Del., has taken a contract to build an iron steamboat for the Day Line between Albany and New York on the Hudson River. The new boat is to be 15 ft. longer than the "Albany," and is expected to be a very fast boat.

The Wainwright Manufacturing Co., Boston and New York, besides being manufacturers of feed-water heaters, filters, expansion joints, corrugated tubing, etc., make a specialty of the purification of feed-water for boilers, its method having been approved by use both in this country and in England. The company has recently erected plants of this nature for C. N. Lyman, Somerville, Mass., and S. N. Brown & Co., Dayton, O., and are now at work on one for the Porter Manufacturing Co., Syracuse, N. Y. The company is also prepared to give estimates for erecting special purifying plants for furnishing pure water to railroad tanks, ready for the use of locomotives.

Iron and Steel.

The Northwestern Rolling Mill Co. recently purchased in Pittsburgh a 10-in. train of rolls for its mill in St. Paul, Minn., with an engine to drive the same.

Mabel Furnace in Sharpsville, Pa., which has received extensive repairs, went into blast last week.

Cruser Furnace in Roanoke, Va., recently made 800 tons of pig iron in one week, with consumption of 2,803 lbs. of coke to the ton of iron. The furnace is 70 ft. high and 16 ft. bosh.

The Calumet Iron & Steel Co. has put its furnace at South Chicago in blast.

The Ewald Iron Co. in Louisville, Ky., is refitting the old Clay street rolling mill in that city and will put it in operation about Nov. 1. The mill will turn out boiler, plate and bar iron.

The Rail Market.

Steel Rails.—A number of sales are reported, including some large orders for 1887 delivery. Quotations remain steady at \$34@\$35 per ton at Eastern mills.

Rail Fastenings.—Quotations are unchanged at 2.40 cents per lb. for spikes in Pittsburgh; 2.75@3 cents for trackbolts, and 1.70@1.80 cents for spikebars.

Old Rails.—The market for old iron rails is firm, with increasing demand and light stock. Quotations are \$21@\$22.50 per ton at tidewater. Old steel rails are scarce and are quoted at \$22@\$24 per ton in Pittsburgh.

The Freight Brake Trials.

Chairman Rhodes of the M. C. B. Freight Brake Committee, informs us that Mr. W. W. Hanscom, San Francisco, Calif., has made application to enter the April, 1887, brake tests with his "straight air automatic brake," and has been so recorded. This makes six brakes now on the list for the April tests.

Western Society of Engineers.

The 229th meeting was held in Chicago, Oct. 5, President Wright in the chair.

The following persons were elected members: Theodore H. Bacon, Assistant Engineer, Dubuque & Northwestern Railway, Dubuque, Ia.; Leslie Warren Goddard, draftsman, 94 Washington street, Chicago.

Mr. Benezette Williams read a memorial paper on Ellis S. Chesbrough. On motion of Mr. Liljencrantz, it was voted that the memorial paper be printed and a copy sent to the family of Mr. Chesbrough. Remarks on the character of Mr. Chesbrough were made by Messrs. Wright, Morehouse, Artingstall and Jones.

The Secretary read a reply, by Mr. J. Freeman Clarke, to the criticism of Mr. Gottlieb on the paper on "Long-Span Bridges," presented by Mr. Clarke at the April meeting.

The Secretary called attention to the portrait of President Wright, which had just been placed in the Society's room. The Society then adjourned.

The Boies Steel Wheel.

The rapid increase of business in the Boies, formerly the Dickson, steel wheel, together with great increase of business in the locomotive department of the Dickson Manufacturing Co., has made it necessary to establish a separate plant for the exclusive manufacture of this wheel. The ground is broken for a large and thoroughly equipped shop, and work will be pushed rapidly to completion. The tools will be the latest and best approved pattern. The hydraulic plant for flanging, stamping and corrugating the plates of this wheel has been especially designed for this purpose by the Niles Tool Co., Hamilton, O., which is also arranging hydraulic cranes and hoists for handling the wheels, the service of tools, etc. To insure the same standard of excellence that has characterized this wheel in the past, Mr. Pierson, late Foreman of the Dickson Co.'s shop, will take the superintendence of the works, so the wheels will be made under the same supervision and largely by the same machinists. Col. Boies likewise expects to give the shop his personal attention.

Iron Works Half a Century Old.

The Tredegar Co. in Richmond, Va., this year completes its first half century of existence, the works having been established by the late Francis B. Deane in 1836. The company now owns rolling mills having a capacity of 40,000 tons of finished iron yearly, while its foundries can melt 25,000 tons of iron a year, and it has also extensive machine shops and car shops. It is the only large iron works in the United States which are driven by water exclusively, the power being obtained from the James River. The present officers are: Joseph R. Anderson, President; Archer Anderson, Vice-President and Treasurer; J. F. T. Anderson, Secretary; F. T. Glasgow, Superintendent Foundries and Car Shops; R. L. Archer, Superintendent Rolling Mills. Gen. Joseph R. Anderson has been in charge of the works since 1841.

A Tunnel Under the Detroit River.

A rumor of a project of importance to railway interests comes from Detroit. It is said that the old idea of a tunnel connecting the province of Ontario with the United States has been energetically revived. It is said that two companies have been formed, one upon each side of the river, with

a capital of \$1,000,000 each, which will be united in a joint corporation and push the project to completion. The tunnel will be one mile in length, with termini at Fort Huron and Sarnia. The estimated cost of the work is \$1,500,000. The tunnel will be of brick, circular in shape, with walls 30 in. in thickness. It will have only one track. If the business warrants the use of a double track another tunnel will be constructed. A careful estimate of the cost of a double track, it is said by the engineers, shows that it is more economical to build two single-track tunnels than one double-track tunnel. Careful surveys and borings have been made, and the feasibility of the project is deemed beyond doubt. Although the construction of the work will be of advantage to the Grand Trunk Railway, it is claimed that that company has no pecuniary interest in it, and that no corporator of either of the tunnel companies is a shareholder in that railroad.

The Poughkeepsie Bridge.

A Poughkeepsie dispatch of Oct. 18 says of the work done by the Union Bridge Co. under its new contract to build the bridge over the Hudson River at that place: "Accurate and complete topographical surveys have been made and exhaustive bearings in the river taken, by which knowledge of all the strata from the overlying mud to the underlying rock has been obtained. The work which had already been done by the American Bridge Co. several years ago has been examined and the extent to which it could be utilized decided upon. Pier No. 2, the westerly pier in the river, is found, by a careful series of borings, to rest on a hard and compact bottom. The caisson on which it rests is also in perfect condition, but the masonry is too small for the present plan, and it will have to be taken out and a new pier built from the caisson up to the top of the old pier, being 20 ft. below high water.

The crib of pier No. 3 has also been examined and found to be intact and suitable, but the borings show that it will have to be settled down 25 ft. more, from which point it will be extended up and the new pier begun at about the same distance below high water as pier No. 2.

At piers No. 4 and 5 the distances down at which secure foundations will be obtained are determined. A part of the crib for No. 4 is already built and arrangements are made for continuing the construction of the same, and soon after placing it in position the work of dredging and settling it down will be commenced. The crib for pier No. 5 will shortly be begun.

The method of placing the masonry will be different from that heretofore employed. It will be built in immense floating caissons that will be settled down into place by the weight of the masonry. In setting the crib, a concrete mixer, similar to that used on the Tay Bridge, Scotland, will be employed, and by its use from 150 to 250 cubic yards of perfectly homogeneous concrete can be placed daily. The work of preparing the foundations for pier No. 1, which is situated west of the highway alongside the West Shore Railroad track, is now rapidly progressing, some 50 Italians having been employed upon it during last week.

The foundations of the west anchorage pier and those of pier No. 6, and the east anchorage pier will be commenced to-morrow with a large force and pushed through as rapidly as unaided efforts can drive them. This is to take advantage of the present favorable weather and to complete the masonry while the river remains open and material can be most conveniently transported. It is expected that the massive plate girders that are built into the bottom of the anchor piers, and to which are pinned the heavy steel bars that hold down the ends of the shore cantilevers, will arrive from the works, at Athens, Pa., about the end of this week, and arrangements are made to commence at once the masonry at those points, by which time also the foundations of pier No. 6 will probably be prepared and the work on it begun as well. The foundation of pier No. 1 will probably take a little longer, because of the large amount of rock excavation necessary and the care necessary to take it out without endangering the West Shore Railroad track.

The derrick barges and stone scows have returned from Rondout, where they were thoroughly overhauled and put in condition for the work they will have to do. A part of the machinery and rigging of Messrs. Dawson, Symmes & Usner, the contractors for the masonry, has already arrived, and the balance necessary is on the way. Among them are some splendid Westinghouse engines that were built expressly for the rapid work and high lifting and lowering of the Niagara cantilever masonry construction, and which are especially adapted to the uses for which they will be employed here.

"The work of taking down the old masonry of pier No. 2 will begin in a few days, by which time the rigging and machinery will be in position for use. The stone as fast as taken down and redressed when necessary will be built into the shore work. The crib at pier No. 3 is also to be commenced as soon as the preparations for doing so can be completed. The work of rebuilding pier No. 2 will be commenced as rapidly after the old masonry is removed as it is possible to float one of the new caissons into place, which will be by that time prepared so that the masonry may be built before ice begins to run in the river or any of the numerous delays of an inclement season need be feared."

A New Car Wheel Foundry.

A very complete car wheel foundry is now nearly completed in Buffalo, N. Y. The works are situated at East Buffalo, just opposite the old passenger station of the New York Central & Hudson River Railroad, and close to the station of the Buffalo Belt Line. The shipping facilities at this point are unequalled, the location being near the track of the New York Central, the Erie, the Lake Shore, the West Shore, the Buffalo, Rochester & Pittsburgh, and the Lehigh Valley, and tracks directly from the Lake Shore are laid into the yard. The lots on which the works are built have a frontage on Howard street of 165 ft. and run through 425 ft. to the New York Central tracks, and in addition there is a lot of 90 by 150 ft. which can be used. The foundry is a brick building, 75 by 150 ft., and 30 ft. high, with a wing containing the cupo as, 22 by 42 ft. It is built on the most improved plan and is lighted from windows in the roof as well as on all sides. Adjoining the foundry is a building 35 by 150 ft., containing the storehouse, pattern rooms, etc., and also an engine house, containing a 50 H. P. engine, furnished by the Erie City Iron Works, Erie, Pa. The scales to be used are furnished by Fairbanks & Co., who are now putting in a 40-ton track scale, with wagon and other smaller scales. The present capacity of the works, which are just ready to start, is 150 wheels per day, and the intention is to run them on the plan of making a thoroughly good and reliable wheel from the best material. The shop is provided with rail-road tracks, turn-tables, cranes, etc., for the purpose of facilitating the handling of material in every respect.

The works will be known as the Root & Brown Car Wheel Works. The firm is composed of Mr. Clarence E. Root, Manager for the American and Wells-Fargo express companies at St. Louis, and Mr. Henry M. Brown, who was for a number of years Manager of the Scoville Car Wheel Works, and for two years past Superintendent of the Buffalo Car Wheel Works, having thus acquired an experience in every branch of the car wheel business. The works have been built by Mr. Henry Smith, of Buffalo, under the superintendence of Mr. Brown.



Published Every Friday,
At 73 Broadway, New York.

EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

FLAT WHEELS AND "GOOD RUNNING ORDER."

Two recommendations of some importance for changes in the interchange rules for freight cars were made at the last meeting of the New England Railroad Club, as reported in another column. The first was that the present form of Rule 2, "Cars must be delivered in good running order and returned in as good general condition as when received," be amended by inserting the words *and in safe condition for train-men*, after "good running order." The second was that clause *a* of causes for refusal, Rule 3, be amended from "Worn or slid flat, exceeding 2½ inches in length or diameter," to read "Worn hollow, or having straight flat spots 2½ inches in length, caused by sliding."

The master car-builders, or, at least, many of them, have taken wise action this year in insisting that there shall be some preliminary discussion of the interchange rules at least—which are, perhaps, the most important business which comes before the general convention—before that convention is held. Like other conventions of the kind, it holds but brief sessions once a year, and during them questions and reports on matters of great importance—proper discussion and action on which require careful consideration and thought—are sprung upon the members all at once, with the frequent result that the subject is postponed for a whole year, or the members wish it had been when they come to consider the action taken more at leisure. In part this is unavoidable. The capacity of committees for procrastinating, and only finishing their report at the last minute, is almost unlimited, but in part it has been a matter of deliberate policy to keep secret until the last minute even reports which were already in type. Something may be said for such a policy, no doubt, but on the whole it seems clear that it is likely to be evil in its effects.

It is fortunate, therefore, that the interchange rules are to have, as they seem likely to have, a pretty thorough discussion in local clubs before they are finally reached for revision, but it will be well to keep in mind also two other dangers; that suggestions made in haste may go through almost by default, and that the rules may be amended to death, or so changed about and twisted each year that inspectors will become confused as to what they really mean, by unnecessary verbiage if not by essential changes; so that harm rather than good will result.

Both of the changes suggested at the last meeting of the New England Railroad Club seem to us of this objectionable character. The first one is comparatively harmless, but the last one, we fear, would be exceedingly injurious in effect. The rule as to the flat wheels, as it now reads, is exceedingly plain, in one sense, at least. "Flat," used in connection with the

tread of wheels, can have only one meaning. Whenever the tread bears the peculiar and unmistakable marks of having been worn away from its cylindrical form at any point, that wheel has begun to wear "flat" at that point, and every yard-man would call it so. Moreover, the precise limits over which this "flattening" extends may be always, or nearly always, clearly determined by the eye and even by the touch alone. It matters not whether the surface over which this "flattening" extends is precisely flat in a geometrical sense or not (so that a straight-edge will lie on it). In a practical sense, the wheel is "flattened" over the whole size of the spot, and any inspector would be clearly within his right, under the rules as they now read, and would unquestionably be upheld by his superiors, in rejecting any wheel which showed "flattening" over a length of 2½ in. in either direction, whether as flat as if it had been planed or not.

While it is very hard to be positive as to what thousands of inspectors scattered all over the continent are doing, we entertain no doubt that this is likewise the all but universal practice throughout the country, for two reasons:

First, we do not believe that a flat spot 2½ inches long can be found which is *precisely* "flat." It may appear to be so, or even slightly concave, but as a matter of fact, when a straight-edge is put on a large flat it will always be found to crown very slightly, so as to take off, perhaps, a quarter or a third of the size of the spot. But far more important than this:

Secondly, it is impossible that it can be a general practice to let wheels run with flat spots until a straight-edge will lie flush on the latter for a length of 2½ in., because a defect more ruinously destructive to track and rolling stock both than such a spot can hardly be imagined.

Considering the track alone, we do not hesitate to say that such a wheel will do more damage to the rails, ten times over, in a single run of 100 miles, than the entire value of the wheel new. For the effect is precisely the same, as respects the force of the blow to the rail, as if the track were laid with pieces of rails only 8.64 ft. long (the circumference of the wheel) with a gap of 2½ in. between the ends of the rails. Of course the ends of the rails would be far more seriously battered by the force of the blow than is the solid body of the rail by the flat wheel, but the force of the blow itself would be the same.

This blow, moreover, is vastly more forcible than the apparent drop would indicate. The drop alone is considerable, for a brief computation will show that a dead flat 2½ in. across shortens the radius of the wheel ¼ in. But the wheel and load upon it has to drop through this ¼ in. in an inconceivably short space of time, *viz.*: the time while the train is advancing 1½ in. Now, a train running at 30 miles per hour moves through 44 ft., or 528 in., in a second. Hence it will move over 1½ in. in $\frac{1}{528} = 0.0023675$ second, or about $\frac{1}{400}$ of a second, which is very quick time. In this brief fraction of an instant the wheel falls through its $\frac{1}{4}$ in. or (exactly) 0.00395 ft. Consequently, the velocity with which the flat spot strikes the rail is

$$\frac{0.00395}{0.0023675} = 1.6685 \text{ ft. per second.}$$

Now, a body to acquire this velocity has to fall freely, and at its leisure, through a height of something over half an inch, which means that the effect of the flat spot is the same as if a weight of 3 to 6 tons were dropped upon the rail every 8½ ft., or five times per second, many of which blows, of course, would hit upon the joints, and thus do many fold more damage, while all of them react upon the bearings, journal and car-body generally. Any one who has ever ridden over a very flat wheel knows what a terrible shaking it gives to the car, and will not need to have this argument further enforced. The rails which such a wheel passes over are worth in the track nearly \$250,000 for 100 miles of single rail, and the chances are many to one that the passage of 1,000 such wheels over it would render half of its length unfit for further service.

It would be to the last degree unfortunate, therefore, and a distinct retrogression to bad practice, if any such emendation as that proposed at Boston should be adopted. The motive for it was commendable. It is natural for an officer of the car department to desire to get the last degree of service out of the material in his charge, and there is moreover a certain force in the objection raised, that those who really spoiled such a wheel were those who flattened it to 2 in. and not those who finished it to 2½ in. and had to take it out. But that, if an argument for anything, is an argument for contracting the limit to 2 in., and not expanding it to what amounts to saying that no wheel shall be removed as flat until so bad as to be dangerous and

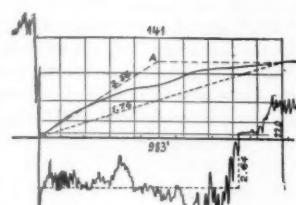
ruinously destructive. The fact is, all rules of the kind must work unequally and to some extent unfairly. Some will be more lax (or, as they will call it, reasonable) than others, and suffer thereby. The true method in such cases, is, *first*, to make a rule which is definite and positive in its limits, so that there can be no dispute as to its interpretation; *secondly*, to fix the limit so as to positively insure that all wheels which are unfit to run shall come out; and *thirdly*, for all parties rigorously to adhere to the letter of the law, regardless of anything else.

The rule, as it now reads, and is now interpreted, answers to these requirements. The rule, as proposed, would not answer to any one of them. To take the limits of the flat as where the marks extend to is definite within almost a sixteenth of an inch, for the measurements of a dozen men would hardly differ more than that from the average. On the other hand, who that remembers his apprenticeship at the bench, and the difficulty he had in filing anything flat, will believe that any wheel could be found which could not be quibbled over as to whether it was "dead" flat?

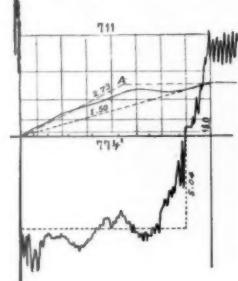
Under the present rules, long before the wheel is dead flat for 2½ in. it will be "flattened" for that distance, and have to come out, and this is as it should be. A wheel so worn, and in some cases still less worn, is unfit for service, even if the dead flat be less than 2 in. Finally, the dispute as to who wore out the wheel is really nothing to the purpose. The last road may be less guilty than the one before, but so may it than the second one before, and so on back to the first one who ever ran the wheel. Very possibly the fault lies back of them all, with the maker, but as the rule must hold some one responsible for it, it properly and necessarily holds the man who was caught with the wheel in bad order to be the guilty person, requiring him on the one hand to accept and run the wheel if it falls just short of bad order, and on the other hand permitting him to pass it along to the next road if it just falls short of bad order in the same way when it leaves his hands. In the effort to avoid spoiling such wheels and having to pay for them, all parties must necessarily take care also to avoid beginning the spoiling of other wheels, and so the interests of all parties be served. As respects any one wheel, there may be great injustice, but in the aggregate the road which is the most careless will have most wheels to pay for.

So in respect to other more doubtful matters. The only true rule for the working of so vast a system of interchange is the spirit of old Mrs. Battle's rule for whist: "A clear fire, a clean hearth, and the rigor of the game." It may at first sight seem a very reasonable and fair arrangement for the Boston & Albany to receive back from foreign roads cars with broken sills which bear marks of having been weakened by decay, but we have only to consider a moment to see that not only is there no moral or legal obligation for them to do so, but it is, in a sense, "contrary to public policy." In the first place, it opens the door to endless dispute as to just what part bad usage had, and what part decay, in causing the fracture, and thus brings in uncertainty where now is certainty—the certainty that if a car breaks down on one road it must be fixed up. But apart from that—when a road accepts a car, it accepts it as "in good running order." What is "good running order?" Plainly, that it is fit to run, which implies (1) that it has no broken parts; (2) that it has no parts so rotten that a fair and probable blow in service will break them; (3) that it is safe for train-men to climb on to and over; (4) that it will properly protect the load. No reasonable man can claim that, except under an unduly lax system, the single phrase "good running order" does or should mean less than all four of these things, and hence the proposition specifically to mention one of them ("safe for train-men") seems calculated to do more harm than good by implicitly excluding the others. Now when the Boston & Albany delivers a car for Chicago, and it is accepted as in "good running order," and two or three weeks afterward comes back with broken end-sills which bear marks of decay, if it accepts that car back again without repairs, it says in effect: "We admit the timbers were rotten and unfit for service; we desire such cars to be accepted and passed along, and we absolve you from all obligation to look out for such defects in your inspection." It needs no discussion to show that without doing any one any good, the effect of such a practice is bad. It tends to encourage all inspectors to be lax about rotteness until cars break down from it—when the road which has the most "cheek" is likely to escape from the largest share of its just burden. It must take some cheek in any case, for before a car gets so rotten as to break under fair usage it is all but certain that it will be

HAND AND ENGINE BRAKES
ONLY—25-CAR MIXED
TRAIN.

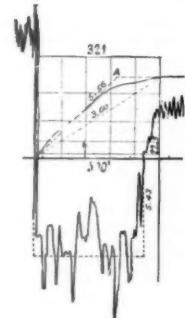


Westinghouse Train.



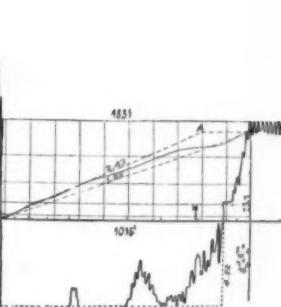
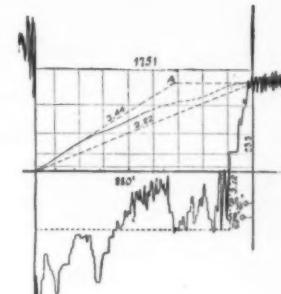
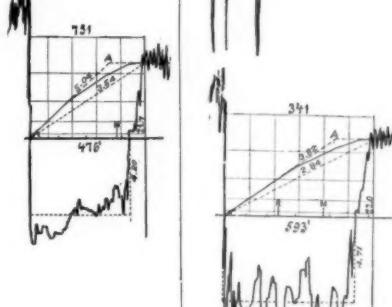
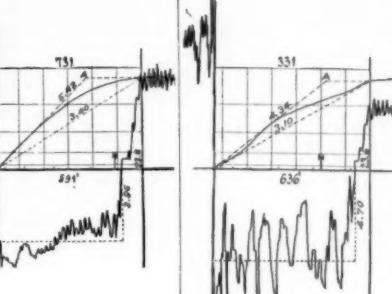
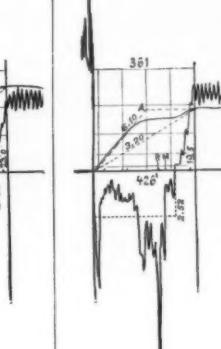
American Train

HAND AND ENGINE ONLY.



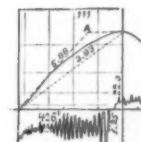
WIDDIFIELD & BUTTON 4TH
25-CAR TEST AFTER READ-
JUSTMENT.

25-CAR MIXED LOADED AND EMPTY—GENERAL TESTS—EMERGENCY STOPS.

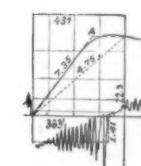


ROTE.

ENGINE AND DYNAMOMETER
CAR ONLY.



WESTINGHOUSE AUTOMATIC.

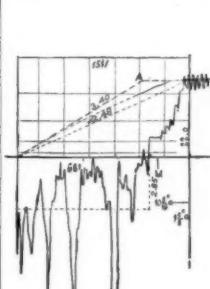


WESTINGHOUSE STRAIGHT AIR.

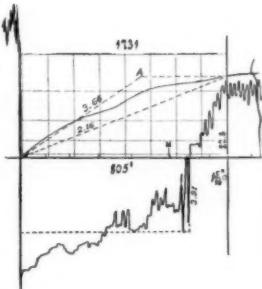
25-CAR MIXED—REAR 12 CUT OUT.



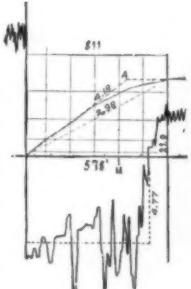
Service
Stops.



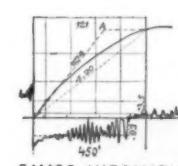
EAM.



AMERICAN.

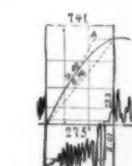
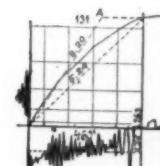


WIDDIFIELD
& BUTTON.
*See also, "fourth test
in first col."*



EAMES AUTOMATIC.

(EAMES STRAIGHT VACUUM.)
(Diagram lost.)



AMERICAN.
ENGINES.

WESTINGHOUSE.

EAMES.

AMERICAN.

WIDDIFIELD & BUTTON.

50 EMP.

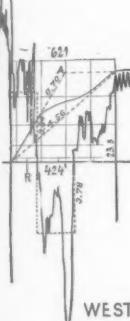
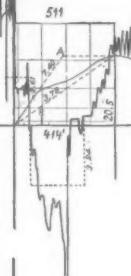
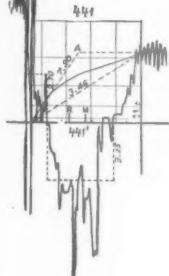
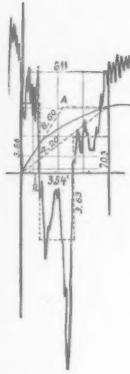
WESTINGH.

50 EMPTY

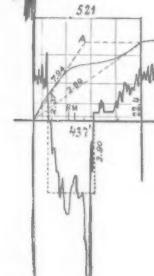
CARS-

GENERAL TESTS -

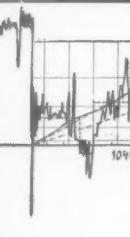
EMERGENCY ST



WESTINGHOUSE.



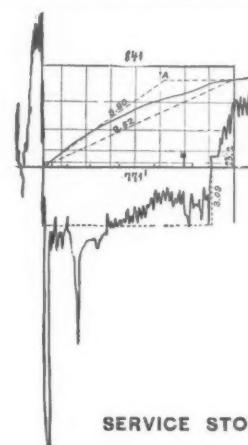
AMERICAN.



50 EMPTY



CARS-



SERVICE STO



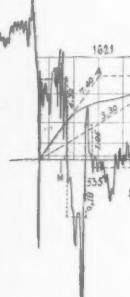
WESTINGHOUSE.



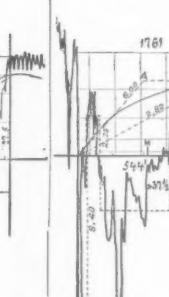
EAMES.

AMERICAN.

50. EMPTY CARS-REAR 20 CUT CUT.

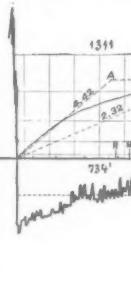


WESTINGHOUSE.

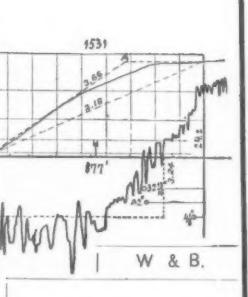


EAMES.

EAMES.



AMERICAN.



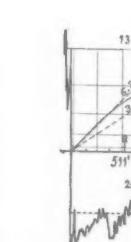
W & B.



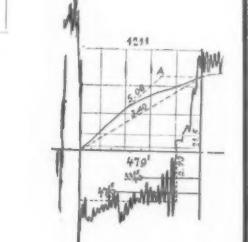
WESTINGHOUSE.



EAMES.



AMERICAN.

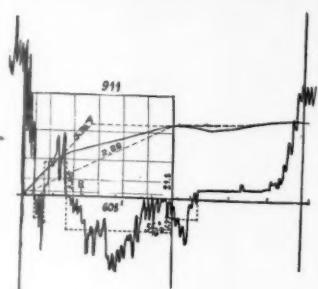


AMERICAN.

FIRST HORIZONTAL ROW SERVICE STOPS—SECOND, EMERGENCY.

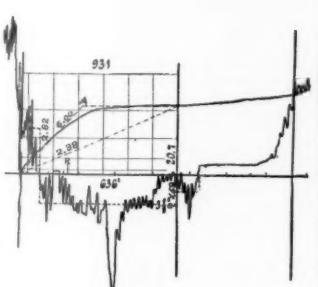
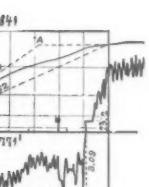
EMERGENCY STOPS.

50 MIXED LOADED AND EMPTY-SERVICE STOPS.

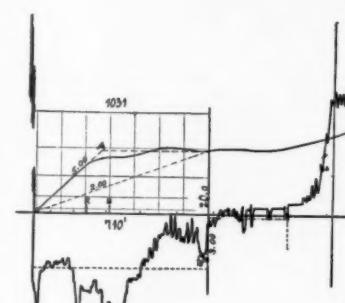


(Stop 1031—Diagram Imperfect.)

AMERICAN.



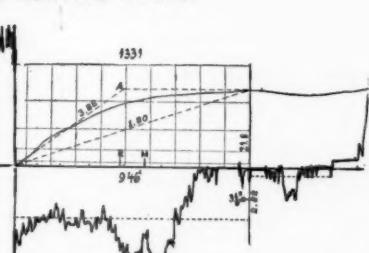
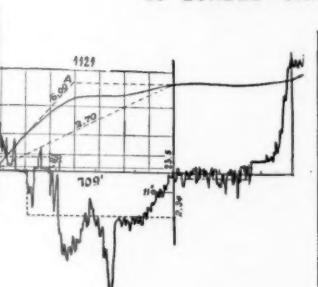
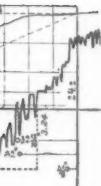
WESTINGHOUSE.



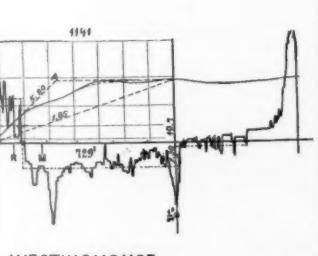
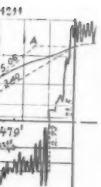
EAMES.

SERVICE STOPS.

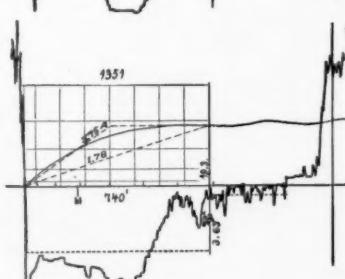
50 LOADED CARS—SERVICE STOPS.



W & B



WESTINGHOUSE



EAMES

BURLINGTON BRAKE TESTS.

OFFICIAL RECORD AND ENERGY DIAGRAMS.

NO. 1 STOPS—from 20 Miles per Hour, on a Level.



broken under the combined effect of partial decay and somewhat unfair usage.

DEFINITENESS, it is clear, is an even greater virtue than absolute justice in rules of this character. If a rule be exact and precise, and the same for all, it is far more likely to effect substantial justice in the give and take of service than even an abstractly fairer rule which is more or less ambiguous, and leaves a way open for sneaking out or lying out of a just share of the burden. The simple rule that if an accepted car breaks down from any cause it must be repaired by the road that breaks it is absolutely definite, and he is rendering no real service to his own road or any other who swerves from the strict letter of this rule by a hair's breadth.

THE GRAIN MOVEMENT FOR NINE MONTHS.

For the nine months ending with September the receipts and shipments of grain of all kinds (not including flour) at the eight Northwestern markets and the receipts at the Atlantic ports have been, in bushels, for the past thirteen years:

Year.	Northwestern		Atlantic	
	Receipts.	Shipments.	Receipts.	Shipments.
1874.....	135,539,026	100,978,744	90,317,587	
1875.....	107,078,154	108,317,011	99,050,212	
1876.....	134,644,912	102,608,642	120,704,125	
1877.....	125,746,276	104,579,109	110,244,342	
1878.....	176,267,016	143,193,182	160,154,092	
1879.....	180,149,691	152,620,459	213,798,134	
1880.....	211,012,801	183,665,400	229,131,380	
1881.....	191,655,139	158,370,352	184,169,187	
1882.....	152,203,526	128,658,865	109,732,226	
1883.....	165,519,222	166,093,759	142,857,037	
1884.....	191,026,357	161,899,155	117,566,136	
1885.....	186,447,927	157,922,621	137,415,466	
1886.....	200,142,358	151,173,783	146,360,739	

The receipts of the Northwestern markets were thus larger this year than in any other except 1880, but not much larger than in any year since 1879, except 1882. The increase over last year is 7½ per cent., and over 1884 4½ per cent. The average for the nine months since 1877 has been 187½ millions, and this year is 6½ per cent. above that average.

The shipments of these markets were with one exception the smallest since 1878, but only 4½ per cent. less than last year. The excess of the receipts over the shipments of these markets has been, in millions of bushels:

1877. 1878. 1879. 1880. 1881. 1882. 1883. 1884. 1885. 1886.
21.9 33.1 27.5 28.2 33.3 25.5 29.4 29.2 28.5 40.0

The excess this year is thus very much greater than ever before. It represents changes in stocks on hand as well as consumption. The consumption of these markets is, in the aggregate, a large quantity, and it has increased greatly with their population in the course of five or ten years, but of course not very greatly in any one year.

The Atlantic receipts were larger this year than in any other since 1881, but 20 per cent. less than then, 36 per cent. less than in 1880, and very much less than in 1878 and 1879, which is sufficiently accounted for by a great decrease in exports.

The proportion between the Northwestern receipts and the Atlantic receipts has changed greatly since 1880. For the three years then ending the Atlantic receipts exceeded the Northwestern receipts. Since then they have become very much less. The excess of the Northwestern receipts over the Atlantic receipts and of the Atlantic receipts over the Northwestern in the several years have been, in millions of bushels:

Year.	At-		At-		
	N. W.	A-	N. W.	A-	
1874.....	45.2	....	7.5	....
1875.....	8.0	....	42.5	....
1876.....	14.0	....	52.7	....
1877.....	15.5	....	73.5	....
1878.....	12.9	1885.....	49.0
1879.....	33.6	1886.....	53.8
1880.....	17.2	....		

Not the whole grain movement is covered by these reports, as many shipments go directly from interior Western points to interior Eastern points and escape record, but unless these shipments have decreased greatly, the consumption between the seaboard and the Western markets must have greatly increased, which no doubt has been the case.

The receipts at each of the principal Northwestern markets for the nine months in each of the last seven years have been, in millions of bushels:

1880.	1881.	1882.	1883.	1884.	1885.	1886.	
Milwaukee..	11.1	12.7	10.6	12.8	12.4	11.1	10.5
Chicago....	103.5	95.6	70.3	100.8	95.0	95.0	100.3
Toledo....	29.2	18.8	15.3	18.9	10.4	8.8	15.1
Detroit....	6.0	6.0	5.2	7.2	7.8	8.2	4.7
Cleveland ..	4.9	3.6	3.0	3.7	3.2	2.5	4.7
St. Louis....	35.0	33.4	31.1	32.5	31.5	34.0	30.5
Peoria....	18.1	20.9	15.4	17.0	19.2	19.0	15.5
Duluth....	2.6	0.7	1.3	2.6	4.6	7.2	13.4

Total..... 211.0 191.7 152.2 195.5 191.0 186.4 200.1

There have been important changes in the production in different parts of this country in these seven years, but the effect on the most important of the old markets has been less than might have been expected.

Comparing this year with 1880, for instance, there is a decrease of 11.8 millions in the total receipts, while only at Toledo is there a great decrease in receipts, 14.1 millions, while St. Louis lost 5.4, Chicago 8.2, Peoria 2.6, Detroit 0.6; and Duluth gained 10.8 and Detroit 8.5.

The relative position of the several markets, however, is best shown by the percentage of the total Northwestern receipts arriving at each, which has been:

	1880.	1881.	1882.	1883.	1884.	1885.	1886.
Chicago.....	48.8	49.9	46.2	51.5	50.2	51.3	50.1
Milwaukee....	5.2	6.6	7.0	6.6	6.5	6.0	5.3
Toledo....	13.8	9.8	10.0	9.7	8.6	4.7	7.5
Detroit....	3.2	3.1	3.5	3.7	4.1	4.4	5.0
Cleveland....	2.3	1.9	2.0	1.9	1.7	1.3	2.3
St. Louis....	17.0	17.4	20.4	16.6	16.5	18.2	15.3
Peoria....	8.5	10.9	10.1	8.7	10.0	10.2	7.8
Duluth....	1.2	0.4	0.8	1.3	2.4	3.6	6.7

Total..... 100.0 100.0 100.0 100.0 100.0 100.0 100.0

Chicago has always had nearly half the total and tends to gain rather than lose: Milwaukee loses rather than gains, but shows no great change in its share of the receipts; Toledo loses, and though it has a larger share than last year, it is less than in any of the five years previous; Detroit has gained; St. Louis has a smaller share this year than in any other in the table, and has averaged 16.6 per cent. of the whole for the last four years, against 18.3 for the three years previous. Peoria has lost decidedly this year, but was very steady before, with 9.8 per cent. of the whole. Duluth, of course, has a very large gain, its position having been created in this time, and all the more remarkable because it is a wheat market exclusively.

Judging from this table, it would appear that the growth of Duluth receipts has been at the expense neither of Chicago nor Milwaukee, but rather of Toledo and St. Louis. This, of course, is not true. It is a change in production in other fields of the markets for grain and methods of shipping it that has affected the Toledo and St. Louis receipts, not the growth of Duluth.

The receipts at each of the Atlantic ports have been, for the nine months, in millions of bushels:

	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.
New York....	88.4	90.6	100.1	88.7	55.6	69.9	57.6	70.1	72.8
Boston....	11.2	15.2	18.2	17.3	10.8	14.0	12.5	12.7	14.3
Portland....	1.6	1.1	2.0	1.3	1.1	1.9	1.8	1.6	0.5
Portland....	10.0	10.5	13.3	9.2	6.8	8.5	6.3	5.8	9.4
Phila....	29.0	35.5	34.5	20.5	11.2	13.7	10.3	15.7	12.9
Baltimore....	30.5	42.9	40.2	31.8	16.3	25.3	20.9	20.9	24.4
Richmond....	8.6	8.8	15.8	15.3	7.9	12.6	7.4	8.8	2.1
New Orleans....	8.6	8.8	15.8	15.3	7.9	12.6	7.4	8.8	10.0

Total..... 182.3 204.6 230.2 184.1 109.7 142.9 117.6 137.4 146.4

Of the decrease of \$3.8 millions from 1880 to 1886, New York has lost 33.8; Philadelphia, 21.6; Baltimore, 15.8, and Boston, 3.9 millions. Philadelphia has lost most comparatively. Compared with last year, while there has been a gain of 9 millions in the total, Philadelphia has lost 2.8 and Portland 1.1 millions, while there has been a gain of 3.6 millions at Montreal, 8.5 at Baltimore, 2.7 at New York, 1.6 at Boston and 1.2 at New Orleans.

The percentage of the total Atlantic receipts arriving at each port has been:

YEAR.	New York....	Boston....	Portland....	Montreal....	Philadelphia....	Baltimore....	Richmond....	New Orleans....
1876.....	40.7	7.8	1.5	8.3	19.8	18.2	....	3.7
1877.....	43.8	9.3	0.8	7.8	13.2	19.7	....	5.4
1878.....	48.5	7.8	0.9	5.5	15.9	16.7	....	4.7
1879.....	44.3	7.4	0.5	5.1	17.4	21.0	....	4.3
1880.....	46.1	7.9	0.9	5.8	15.0	17.5	....	6.8
1881.....	48.2	9.4	0.7	5.0	11.1	17.3	....	8.3
1882.....	50.7	9.8	1.0	6.2	10.2	14.9	....	7.2
1883.....	46.8	9.8	1.3	6.0	9.6	17.7	....	8.8
1884.....	48.7	10.7	1.6	5.2	8.7	18.0	0.7	6.4
1885.....	51.0	9.2	1.2	4.2	11.5	15.2	1.3	6.4
1886.....	49.7	9.8	0.4	6.4	8.9	16.6	1.4	6.8

The smallness of the changes in the percentages of New York, as in those of Chicago of the Northwestern receipts, is remarkable. New York's share increased when the exports fell off, but for the last six years it has had from 46.8 to 51.8 per cent. of the total Atlantic receipts, averaging 49.3 against 44.7 for the five years from 1876 to 1880. Boston's share has also increased since 1880. For the five years then ending it averaged 8 per cent. of the whole; for the last six years, 9.8 per cent. Both of these places are large consumers of grain, which gives them large receipts when exports are small, as they have been of late years. Portland makes an unimportant figure when it receives most, and is least important this year. Montreal shows no gain from the improved Welland Canal, but it holds its own very well, and most of its receipts are exported. Philadelphia, which had a large export business for a few years, has almost ceased to export, and its share is not half as large as in 1876. For the four years 1876 to 1880, its average was 16.3 per cent.; for the last six years, 10 per cent. Baltimore, which exports most of its receipts, has not quite held the position which it gained after 1875. Then its receipts for five years were 18.6 per cent. of the whole; for the last six years, 16.6 per cent. New Orleans gained some what after the improvement of the mouth of the Mississippi, but it has not held all it gained. In the first four years it received on an average 4.5 per cent.

of the whole; for the next four (1880 to 1883), 7.8; for the last three, 6.5 per cent. In amount its largest receipts were in 1880, and next to that in 1881, but that is true of most of the markets also, and while its decrease since 1880 has been 36½ per cent., that of New York has been 31½ per cent., and of Philadelphia 63 per cent., so it has not fared particularly ill.

Ten years ago there was great excitement at New York because of what was regarded as a threatened serious diversion of its grain trade to Baltimore. Very little was said of Philadelphia, but it received more grain than Baltimore in 1876, when there was the chief contest for it. These two places received nearly as much as New York in 1876. Together they had 38 per cent. of the whole in that year and 38.4 in 1879, but since 1880 they have never had 30 per cent., but only from 25.1 to 28.4 per cent. New York and Boston together had but 48.5 per cent. of the whole in 1876, but always more than 50 per cent. since, and since 1880 not much less than 60 per cent., namely, from 56.6 to 60.5 per cent., averaging 59 per cent., and always more than double the Philadelphia and Baltimore receipts. New Orleans was also regarded as a dangerous rival of the Eastern cities about 1879, but it has not proved to be, and in the last seven years has received but about one-seventh as much as New York and a fourth less than Boston. The old markets have not lost position, but have gained rather.

The harvest often makes so great a

the practical but unscientific warning given by the fact that this pay car had bobbed around the road for the past dozen years, stopping wherever it pleased, and protecting itself generally by nothing better than a man with a red flag who was posted upon the rear platform, or, if sent out a short distance, was always called in before a start was made.

Who shall say that station agents and operators who deem it a light matter to omit to record the passage of a train, and who, like poor Jamison of the Missouri Pacific, may some day in serene unconsciousness precipitate a collision and have two or more murders laid at their door, are to be found only "out West"? Sea-serpent stories and yarns about snakes always come from a distance, but grim realities like Jamison's fatal blunder are not so accommodating.

Do I know what my men's habits of mind are? Do my conductors and engine runners when approaching a telegraph station think chiefly about their prospects of getting by without interference, or do they assume (as they should) that holding orders are *likely*, and that further progress is not safe until all the possible restraining causes have been canvassed and found inoperative? When experienced trainmen are running over an unguarded road after a dangerous rain, they pass no doubtful point until they have made mental inquiry and received satisfactory answer concerning its passableness. Precisely the same principle should apply at telegraph stations *at all times*, the facilities of course rendering it possible to follow it without reducing speed, as would be necessary in looking for washouts. When I feel, and perhaps express confidence, in my best men, say the passenger runners, do I have any definite knowledge as to what they do or have done to merit confidence? And if I do know their ways of working, have I taken any pains to see whether the less experienced men are taking lessons from them, or are groping their way alone? Do I forget (as so many do) that the running of a freight train, which must be kept out of the way of passenger trains, is in many respects a more difficult task, and so deserving of better talent, than the care of a passenger train that has to respect no other train's rights? Mr. Slayback's collision with a gravel train on the New York, New Haven & Hartford some time ago suggests the query whether a runner accustomed to freight and working trains where he *must* constantly subordinate himself to the rights of others, would not be more uniformly likely to watch carefully for danger signals than would an express man who is constantly deferred to by every one else, and who thus grows to be essentially selfish. Changing the men around occasionally would perhaps shed some light on this point.

How many conductors depend more or less upon their enginemen to restrain them from rash moves? Freight trains on second-class roads are known to be afflicted with this sort of fellows; am I sure none have crept into my force? I have "instructed" my enginemen to have their firemen always look for dangerous switches and crossing signals, as an additional safeguard; how many of them have the mental firmness and moral courage to hold the fireman to this duty if he has a tendency to shirk it?

These are a few of the many questions most superintendents should ask themselves. They can be answered only by a great amount of painstaking and careful investigation. The old warning seems ever and anon to come back to us, that the chief defect in Americans' training is that they despise details. The Old Colony road some years ago issued to its employés a circular setting forth the records of accidents in the United States, and other patent facts suggestive of the methods by which accidents should be guarded against; in fact, giving the men a telling hint and a first-rate opportunity to profit by others' experience. Doubtless other roads have taken similar action; but it is to be feared that in many cases it serves only as a hint or as a short-lived impression—exceedingly good as far as it goes, but failing to become the means of implanting the numerous lasting convictions that it should. The securing of safety in train-running requires that many things be done in the way that firemen run to a fire—in a hurry, and yet in response to habits that lead one instinctively in the right direction. These habits cannot be fixed in men's minds by a general order: they are not to be plastered on to the surface like whitewash; they are a growth, and both the planting and the nursing require constant attention from the master hand. No superintendent has performed his full duty until he has done all that in him lies to see that the warnings given by such events as Silver Creek are just as keenly appreciated and soberly remembered by his higher subordinates as they are by himself.

The Chicago railroads make some progress in their negotiations for co-operation. The lines from Chicago

and St. Louis to Kansas City and other Missouri River points have agreed to make a gross money pool for the passenger business, giving the Wabash its share by arbitration and dividing among the others in proportion to the business they have actually carried during the last three years.

In the Southwestern Association, which deals with the freight over the same lines, the Wabash has applied for an increased percentage and its demand will probably be submitted to arbitration.

The lines northwest of Chicago have agreed to exclude grain and flour from their pool on east-bound freight, and coal, lumber, stone and cement from the west-bound pool, and to pool the rest. The grain and flour form much the larger part of the shipments from St. Paul and Minneapolis, but they have yielded little or no profit this year, and because of the competition of Lake Superior are not likely to be very profitable hereafter.

Recent Rail and Water Grain Movement.

The shipments of grain by rail from the Northwestern markets have been large ever since August, but they cannot be said to have increased in that time, nor have the shipments by lake decreased, while lake rates have been pretty evenly maintained between 4½ to 4¾ cents per bushel for corn and half a cent more for wheat from Chicago to Buffalo, all but a small part of the shipments from that port being corn. There is no doubt that rail rates have not been maintained, and the cutting of them for a time seems to have been general, but recently some of the lines assert that they have restored rates because of a pressure of traffic. The movement itself is very good evidence that the reductions from regular rates have not been large, and that they have not grown greater, at least, than they were in September; the shipments by lake, river and rail in successive weeks having been:

Week to	By rail,	Down Miss.	By lake,	Total.
Sept. 12	2,511,638	308,300	2,778,471	5,598,297
" 19	2,594,355	171,229	3,141,378	5,9,6,962
" 26	2,270,422	206,413	3,293,932	6,770,767
Oct. 3	2,012,397	158,358	3,002,959	5,173,714
" 10	2,384,548	125,176	3,747,227	6,257,951

If the rail rates had been much below 25 cents per 100 lbs., either the shipments by lake would have been less or the lake rates would have gone down; and if the reductions in rail rates were becoming greater and greater, as they are likely to do when rates are cut at all, unless the pressure of traffic makes it difficult to provide for it, the shipments by rail should have increased. Actually the cutting was probably most general early in September, when the rail shipments were greatest; and though reductions as great as these may be made still, they are probably made by few lines, or at few places. The figures are not quite conclusive, however, because one of the leading grains, oats, is very seldom shipped by water, because of its bulk in proportion to the weight, which is felt especially in the elevator charges, which are obviated when the shipments are made by rail. Barley, too, goes cheaply by rail, because it is for the most part consigned to breweries in the interior. If we exclude these, we find that the rail shipments of wheat and corn by rail have increased little or none, having been:

Week ending	Sept. 11.	Sept. 18.	Sept. 25.	Oct. 2.	Oct. 9.
Sept. 11.	632,284	833,170	616,577	539,584	698,235

Moreover, they are but a small proportion of the total wheat and corn shipments, which have been:

Week ending	Sept. 11.	Sept. 18.	Sept. 25.	Oct. 2.	Oct. 9.
Sept. 11, 145	3,965,855	3,968,270	2,575,327	4,358,914	

But the corn also goes to a very large extent to interior points, many of them hardly to be called "Eastern," for which the railroads offer a decided advantage. This is true to a less extent of wheat, even, but the shipments of that grain show best the comparative effectiveness of the competition of the railroads with the lake vessels for carrying grain, and the shipments of wheat have been:

Week ending	Sept. 11.	Sept. 18.	Sept. 25.	Oct. 2.	Oct. 9.
By lake....	1,861,403	1,275,651	1,501,180	1,442,510	1,884,347

Thus the rail shipments have generally been but 10 per cent. of the lake shipments, and they certainly would have been much more if the roads had been carrying for 20 cents per 100 lbs., instead of the regular rate of 25.

It is true, however, that in this period, and especially in the latter part of it, a very large part of the wheat was beyond the reach of the railroads—namely, that arriving at Duluth. As the wheat receipts of the other lake markets, where the railroads are able to compete for it, reached 7,455,000 bushels in these five weeks, we see that the railroads can have done but an insignificant amount of work at these ports even, having carried from all eight markets, including St. Louis and Peoria, which are not on the lake, only 964,821 bushels in these five weeks.

The rail shipments from Buffalo, even, in competition with the canal, where they are much more nearly on even terms, have not been large, but for five weeks the shipments by rail and by canal have been, in bushels:

Week to	All grains.	Wheat.
Sept. 11.....	281,050	1,860,685
" 18.....	398,550	1,870,502
" 25.....	404,350	1,969,277
Oct. 2.....	544,430	1,552,617
" 9.....	502,950	1,394,487

5 weeks.....	2,231,330	6,656,568
	597,830	5,892,820

Thus the shipments of all grain by canal from Buffalo (this does not include grain in transit by rail passing through Buffalo) were nearly four times as great as the shipments by rail. But here again we see that while the water route car-

ried nearly all the wheat, much of the other grain went by rail. Only about 9 per cent. of the wheat was forwarded from the Buffalo elevators by the railroads, but while the canal carried 2,763,748 bushels of other grain in the five weeks, the railroads carried 1,633,500, or 38 per cent. of the whole.

The flour shipments from Buffalo, however, are more important to the railroads than the grain shipments, amounting in these five weeks to 732,000 barrels, which is a greater weight than the 2,231,000 bushels of grain they carried, and all the flour goes by rail. Taking grain and flour together, the rail shipments from Buffalo for this period were something more than half as great as the canal shipments.

The Road-Masters' Convention.

It is gratifying to observe that the Road-masters' Association is growing stronger. Not a little good work was done at St. Louis, as will be seen by our report in another column, and at next year's convention at Cleveland we may expect both that the attendance will be larger and the discussions still more spirited. Since the first suggestion to form such an association was made in these columns in 1871, many abortive and semi-abortive attempts have been made to form a strong organization of the kind, but at last it seems that the effort has been successful, and that the next few years will see the road-masters' organization much increased in strength.

Perhaps the most useful action had was the recommendation of the Hart foot-guard for the crotches of frogs and switches, for the resolution passed amounted to that, although specific recommendation of that device by name was struck out. We are not entirely clear that the Hart is so much the best device that it deserved specific mention, but it is inexpensive, the royalty asked is small, and it is certainly the neatest if it is not the best of all. That humanity requires the use of something of the kind we think to be beyond doubt, and we observe that an increasing number of roads take this view of it, for although the Hart guard is not as yet very common, there are now a very large number of roads which use the clumsy substitute of a block of wood.

The Association left a yawning void in its proceedings, however, in taking no action in favor of the more important device of a re-railing safety frog at bridges,—a void which it will no doubt fill next year, especially if its members read with due attention the last of many instances of its efficiency recorded in another column.

On the important question of joints the Association was equally silent; perhaps, because it thought it too large a subject to discuss at present in any definite way. On the question of broken rails even joints it took a rather decided stand in favor of the former, although not so decided as the tendency of events would warrant. We observe with satisfaction that the practice of laying track to break joints is spreading with great rapidity all over the country. Even the railroads west of Chicago, which have been the stronghold of even joints, are, so to speak, "honey-combed" with what was lately regarded as heresy in that region. It is too large a question to discuss on its merits now, but that the practice of laying joints even, on all but the very poorest of track, is falling into general discredit seems unquestionable, and that there is very good reason for it seems still more unquestionable. On one road that we know of, which has recently changed from even joints, it is estimated that the cost of keeping up the joints has been decreased 20 per cent., this estimate being made by men who were formerly strongly in favor of what may be not unfairly defined as the *track-layer's* favorite.

On the elevation of curves likewise the action had was eminently sensible. While one is reluctant to assert anything of the kind positively, there has long been reason to suspect that the hard and fast rule of "1/2 in. per degree" was neither wise nor defensible. *Uniformity* of elevation throughout the same curve is undoubtedly better than irregularity, and hence any rule, lived up to, will give better results than no rule at all. But before any one adopts a low elevation "to favor freight trains," it would be in order for him to show what no one has yet shown, if indeed any one can show—that a low elevation does favor freight trains, or that it is necessary for minimum resistance to have the elevation just balance the centrifugal force due to speed. It is very common for those who assume the contrary to jump over this enormous gap in their logic by "begging the question"—taking for granted what remains to be proved—and we observe the same tendency in those who took both sides of the discussion at St. Louis, so that it is well to call attention again to the fact that there is a gap, and a very large one.

In other respects the proceedings consisted mainly of informal discussion without any very definite recommendations. It would be wrong to conclude, however, that the discussions were therefore unprofitable; or even that, "saying in a solemn way an undisputed thing," as was done to a considerable extent in the case of drainage, is a waste of time. We take it that no road-master at this late day doubts that good drainage is the very foundation of good track; but there are many who "see the right, and approve it, but follow the wrong," so that any time given up to discussing the advantage of good drainage, as well as methods for obtaining it, is probably well put in.

One measure on which the road-masters might well have dwelt still more fully was on keeping neat station grounds. We have good authority for believing it to be good policy to "assume a virtue, if we have it not," and the road and the road-master who cannot get the money to put up a "sand-papered" track everywhere would, if it and he took a little longer look ahead, sand-paper the station grounds at least, where most people get most of their impressions of track. It is astonishing how one may be impressed in spite of himself with the notion that he is on a very fine road by a little care in this respect.

yet the yards and stations are commonly in worse comparative order than any other part of the track. The Lake Shore pursued the policy referred to very effectually some years ago, and to a less extent does yet. As far as the eye could reach each way from the stations, the track, and likewise the station grounds themselves, were in apple-pie order, while the stretches of track between, although not in bad order, were in fair less finished condition. The effect was that probably nine passengers out of ten thought they were riding over very nearly the finest road in the country, and felt correspondingly contented.

These and many other details of track work the road-masters may well take up in following conventions, and there is no great fear but that all will benefit by the discussions which will follow. They cannot discuss everything at once, and our reports show that they covered a good deal of ground as it was, for three days' work.

Profit and Loss in Cars.

The *American Railroad Journal*, in commenting on the interesting statement prepared by Mr. E. C. Spalding, of the Western & Atlantic Railroad, showing the average mileage, cost of repairs and earnings of cars by ages of from 1 to 10 years, as published in our issue of Aug. 20, 1886, falls into a very natural but rather dangerous error, in respect to the indications of the table by asserting that "these figures show that foreign car service does not result in a fair profit on the investment," and that the prevalent rate of ½ cent per mile is much too small, for the reason that it does not apparently provide for a renewal of the car.

The error lies in assuming that the cost of "repairs" which the mileage rate of ½ cent per mile is found to cover with an average surplus of \$271.17 at the end of ten years' time, includes only repairs proper, but not renewals. This is not the case. In the earlier days of railroads a distinction was drawn between repairs and renewals, and the latter was provided for by a special fund called the "renewal fund," but this useless and meaningless distinction was long since abandoned in American practice (in fact, was never adopted except by a very few of the earlier roads), and the sum of \$489.55 which Mr. Spalding's paper shows to have been expended in maintenance of the average car during ten years includes the proportionate amount of renewals of cars during that time, which in all American practice are treated only as another form of repairs.

In other words, every car, once purchased, is in actual railroad practice treated as a part of the original investment in the road, as much as the grading or track. To show that a rate paid for the temporary use of that car by others is a fair one, it must be shown only that the rate is enough to cover, first, interest on first cost, and secondly, the average cost of "repairs." To expect the rental charge to return the cost of the car likewise at the end of ten years, would be as fallacious as to expect the rent of a house to cover, first, interest on the investment, secondly, the average cost of maintenance and renewal of some thousands of such houses of all ages, and thirdly, the entire cost of the house at the end of every ten years' rental.

To make a fair statement, based on Mr. Spalding's figures, of the profit and loss on an average car kept in service at ½ cent per mile for ten years, it should be put thus:

Interest on cost of car (\$500) at 5 per cent. for ten years..... \$250.00

Repairs (which include renewals), actual average..... 489.55

Total debit charges..... \$739.55

Cr. By 101,348 miles run at ½ cent per mile..... 761.11

Net profit on ½ cent rate..... \$21.56

The *Journal* increases the debit charges by \$500 for the first cost of the car, and the credit charges by \$150 for the value of the old material in the car when broken up—neither of which charges have any pertinency in this connection, and thus reaches what it justly regards as the "very important" result, that railroad companies are losing \$328.83 (being \$350 less \$21.55 above, plus a decimal error) instead of making \$21.55 on every \$761 of car mileage earned, as they actually do.

The bare fact that such large-sized figures indicate that the railroad public has been guilty of the fatuous folly of fixing but little more than half of a fair mileage rate for cars should alone excite suspicion. Such an "impeachment of a whole people" will rarely, on investigation, be found to be well founded. When we remember the way in which the present mileage rate was reached—by beginning at 3 cents per mile, and gradually dropping it through 2 cents, 1½ cents, 1 cent to ½ cent, the improbability of its having been dropped so very much too far is increased.

To show that, on the contrary, this now established mileage rate is very nearly a fair one on both sides, no better road than the Western & Atlantic could be chosen. Many American roads are continually increasing their stock of new cars, and so long as this is so the average age of cars, and hence the average cost of repairs for the time being, is very much decreased. The Western & Atlantic stands in the unique position of having made no change in its stock of 952 cars since 1872, when it was decreased 9 cars from 961 cars. Therefore, on its road, the average cost of repairs should fairly show just what it cost to keep permanently good a stock of about 1,000 cars, without either increasing or decreasing it. The accounts of most of our more active roads, owing to the cause stated, would show this too small by a heavy percentage.

A seventh competitor has now entered for the forthcoming (April, 1887) series of brake tests, Mr. W. W. Hanscom, of San Francisco, Cal., as will be seen by a notice in another column. Mr. Hanscom was one of the few, besides those officially connected with the tests, who had the patience and desire for knowledge to stay through the long series of late

tests, and that he enters after such ample opportunities for observing the successes and failures of the other brakes will naturally tend to raise a prepossession in his favor. His brake is correctly described in the notice by that seemingly incongruous combination of "straight-air automatic" brakes. There is no auxiliary reservoir nor triple valve, yet the brake goes on instantly if the train or a coupling parts. This is accomplished by using two train pipes, always charged with air, as is the brake cylinder. If more pressure exists in one pipe than the other, the piston goes forward and puts on the brake. If less, the piston retreats and takes off the brakes. The difference of pressure can come about either by intention of the engineer or by any rupture of the pipes. As there is less volume of air to move for applying the brakes, and no intermediary mechanism, an advantage is claimed in quickness of application, where certainly there is need of advantage, that being the weak point of all the air brakes, especially at slow speeds, as is shown by the diagrams accompanying this issue.

From this hint a general idea of the mechanism can be obtained, which is all that seems immediately necessary. We have a suspicion that at least one other competitor will enter before the time expires, with an electric apparatus, but this may not prove to be the case. Even as the roll now stands, the test will be of the highest interest, and by the wise conclusion to require close coupling, either by appropriate automatic couplers, or by blocking out the link slack, the element of danger will be eliminated, as well as much delay from breakage.

A communication in another column gives another and very recent instance in which a practically certain and serious wreck was prevented by re-railing safety frogs, which we hope will have the attention which it deserves. There are now so many of these on record that there can be no question that the trifling expense of protecting all bridges by this device will be repaid to any railroad company many fold within a few years. This being so, the plainest dictates of humanity and good sense require that an improvement of this cheap, substantial and unquestionable efficiency should not be neglected as it is by so many.

Another circumstance is worthy of passing note in connection with the record—the long distance which the wheel ran off the track without wandering far away from the rail. All these frequent occurrences illustrate the fact that anything which will effectually restrain the wheels from suddenly slewling a long way out of their usual line will be likely in many cases, if not in nearly all, to avert disaster from derailment.

The *Iron Age* reports weekly capacity of furnaces in blast on the first day of successive months to have been:

	Bituminous					Total.
	Anthracite.	and coke.	Charcoal.			
May 1	36,924	67,888	8,211			113,023
June 1	38,239	70,766	9,867			118,872
July 1	30,762	71,316	9,885			117,961
Aug. 1	36,841	68,852	9,725			115,418
Sept. 1	33,207	68,208	10,797			113,210
Oct. 1	35,819	70,805	10,232			116,853

Thus, there is an increase of 3.2 per cent. in September, when the capacity in blast was the smallest since May, and the output now is fully up to the average of the previous five months. It has been remarkably uniform, in fact, showing no decided tendency either to increase or decrease. But the great gain made since last year has been maintained. The aggregate weekly capacity of the furnaces in blast, Oct. 1, was 72,618 tons in 1884, and 71,608 in 1885, against 116,853 this year, an increase of 45,245 tons, or 63 per cent., in a single year; and, indeed, substantially the whole gain was made in seven months. This seems enough for one year, and it is not surprising that when so great a gain had been made in a few months, there should be no further increase for a time.

The making of iron is in its nature a fluctuating industry, because it is a material of construction, and chiefly of constructions intended to increase production, and such constructions are very numerous where there seems to be room for increasing production, and very few when the existing appliances are manifestly capable of producing in excess of the demand. The most striking illustration is the construction of railroads in this country, which rose from 1,700 miles in 1875 to 11,600 in 1882, and then fell to 9,974 miles in 1884 and 8,131 in 1885. The fluctuations in the other uses of iron are similar, but probably not nearly so great. That the fluctuations are not a peculiarity of this country may be seen by a record of the number of furnaces in blast in Great Britain, Nov. 13, 1879, and at the close of each quarter of the following years, as follows:

	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.
March 31	599	575	572	555	460	478	421	21,961
June 30	557	549	570	545	472	429	386	176,621
Sept. 30	554	548	568	543	453	424	367	240,364
Dec. 31	590	552	565	510	459	421	386	159,991
Nov. 13	458							53,871

As England supplies iron for a great part of the world, and to widely separated countries, the fluctuations in its productions are not likely to be so rapid, even if they are as great, as in a country which supplies itself exclusively and no other country, because activity in construction does not happen at the same time in all the places which it supplies; though there are periods of activity and dullness which affect nearly the whole civilized world—periods of several years, however, in which one country after another is affected until all are prosperous or the reverse. The blast furnaces of Great Britain had a period of activity throughout the period of great activity here and were later in declining, but they declined longer, and fewer were in blast Sept. 30 last than at any other date here noted. We were producing as little iron two years ago as we were a year ago, but Great Britain decreased 6.4 per cent. from 1884 to 1885; our production has increased 63

per cent. within a year past, and in the same time the British furnaces in blast have decreased 18½ per cent. In three years, while nearly one-fifth of the British furnaces have gone out of blast, our production has increased 60 per cent.

The comparison is not exact, because we have only the number of furnaces in blast in Great Britain, while we have the weekly capacity of the furnaces in blast in this country. Here, the furnaces which go out of blast on account of inability to make a profit at current prices are of much less average capacity than that of the furnaces that remain in blast, and that is true also in England. The decrease in production there has not been so great as the decrease in the number of furnaces in blast.

The production for the whole year 1882 with an average of 565 furnaces in blast was but a trifle greater than in 1883, when but 552 were in blast; and with a decrease of 13 per cent. (from 552 to 480) in furnaces from 1883 to 1884, was a decrease of but 11½ per cent. in production; and with the further decrease in furnaces to 435 in 1885 (9 per cent.), the production decreased but 3.8 per cent., the average yearly production per furnace having been:

1880.	1881.	1882.	1883.	1884.	1885.
13,938	14,853	15,050	15,562	15,085	16,668

The increase in the average production was especially notable in 1885, and from 1880 to 1885, with a decrease of 21½ per cent. in the number of furnaces making iron, there was a decrease of only 6 per cent. in the quantity of iron made.

This, however, does not change the fact that production has continued to decline in Great Britain for a year since it began to increase greatly here, and that the decrease for a year past has been much greater than for the year previous and greater than in any other recent year except from 1883 to 1884.

British rail exports in September were much larger this year than last; the largest increase in the exports to any one country being 5,085 tons in the exports to this country; 4,907 tons in the exports to Canada, and 4,820 in the exports to Sweden and Norway. The gain is because of exceptionally small exports last year, and not because of large ones this year; for four years the total British exports in September and for the nine months then ending have been, in tons of 2,240 lbs:

	1883.	1884.	1885.	1886.
September	64,342	35,636	40,526	51,618
Nine months	600,623	431,953	407,810	394,916

The exports last August were larger than in September and yet were less than in August last year.

The exports to this country were exceeded last July and also last April, but they were greater than in any month of last year or 1884. For the nine months ending with September the British exports of rails to the United States have been, in tons:

	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.
	170,961	176,621	240,364	159,991	53,871	16,125	5,071	26,438

Thus this country took five times as many rails this year as last and five-eighths more than in 1884, but only half as many as in 1883, one-sixth as many as in 1882, and one-ninth as many as in 1881. It can hardly be said that there has been as yet any tendency to increase or decrease in the takings of this country, the exports to it in successive months having been:

	Feb.	March	April	May	June	July	Aug.	Sept.
	1,000	836	6,836	1,453	3,184	6,001	1,813	5,813

In these nine months at least 2,400 miles more new railroad was built this year than last, requiring probably 240,000 tons more of rails for this purpose alone, of which England has supplied 21,367 tons. Doubtless there has been also a great increase in the quantity used for renewals, as these have been made on a large scale this year, and a great many railroads avoided expenditures for such purposes as much as possible last year.

The 17 railroads reporting September earnings this week are all small ones, their aggregate earnings being but about \$1,600,000. Only four of them show any decrease in earnings, which is large in the case of the Denver & Rio Grande Western (19 per cent.) and the Mobile & Ohio (18½ per cent.). The gains are generally not large, but the Nashville & Chattanooga has an increase of 15½ per cent., and the Alabama Great Southern an increase of 15½ per cent.

Petroleum exports have been nearly the same this year as last, nearly 433½ millions of gallons for the nine months to Sept. 30, against 435 millions last year. The value of them has decreased more in proportion, from \$37,122,848 to \$35,546,213, or a little more than 4 per cent. In September the exports were 8 per cent. less than last year. The exports from New York and Philadelphia are almost exactly the same as last year and make 96½ per cent. of the whole. Baltimore has exported 11 per cent. more and Boston 36 per cent. less than last year.

The cotton exports were larger this year than last in September, which is the first month of the crop year, and there are indications that the crop may be larger than last year. The reports of the production of this crop, however, are very imperfect, and often turn out to be incorrect. The increase in the quantity of exports is from 61,082,291 lbs to 74,780,395, or 22½ per cent., and in its value from \$6,248,597 to \$7,190,908, or 15 per cent. In 1884 the September exports were nearly the same as last year.

The four leading exports in September last were of a value 16 per cent. greater than last year, but not quite so much as in 1884. The gain over last year is chiefly in grain and flour, amounting to \$6,109,168 (68 per cent.), but there was also an increase of \$942,968 (15 per cent.) in cotton. On the other hand, there was a decline of \$752,795 (17 per cent.) in provisions and of \$1,055,985 (19½ per cent.) in petroleum.

The values of exports of all these except cotton for six years have been :

Year.	Value.	Year.	Bushels.
1881	\$34,405,362	1884	26,062,951
1882	35,526,740	1885	21,395,213
1883	29,026,881	1886	24,861,254

Thus the value this year, though 16 per cent. more than last year, is less than in any other year of the six—5 per cent. less than in 1884, 16 per cent. less than in 1883, and 30 per cent. less than in 1882.

France celebrates the fiftieth anniversary of its first steam railroad next year, with an international railroad exhibition of railroads, railroad appliances and railroad industries, beginning in May, and lasting for six months, and by an "International Railroad Congress," probably like the one in Brussels last year, to be made up of representatives of railroads, of engineering societies, and also of boards of trade and other commercial organizations which are specially interested in transportation. This railroad jubilee is under the patronage of five of the French cabinet ministers, and of other prominent officials and commercial organizations.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines is given in the current number of the *Railroad Gazette* as follows:

Atchison, Topeka & Santa Fe.—The *Southern Kansas Extension* has track laid from Arkansas City, Kan., south 25 miles.

Burlington, Cedar Rapids & Northern.—The *Sioux Falls Branch* is extended west to the Dakota line, 6 miles.

Chicago, Burlington & Quincy.—The *Holdrege Branch, Burlington & Missouri River line*, is extended from Farnam, Neb., to Curtis, 23 miles. The *Galesburg & Rio Branch* is completed from Galesburg, Ill., north to Rio, 12½ miles. The *Ashland Branch, Burlington & Missouri River line*, is completed from Omaha, Neb., southwest to Ashland, 26 miles.

Chicago, Milwaukee & St. Paul.—Track is laid on the *Kansas City Extension* from Ottumwa, Ia., southwest 10 miles. On the *Jamestown Branch* track is laid from Ellendale, Dak., north 10 miles.

Cincinnati, Jackson & Mackinaw.—Extended from Lewisburg, O., south to West Alexandria, 7 miles.

Denver, Memphis & Atlantic.—Extensions of 21½ miles in all are reported on this Kansas line.

Fremont, Elkhorn & Missouri Valley.—The *Lincoln Branch* is extended from Swedeburg, Neb., south to Lincoln, 23 miles.

Helena & Red Mountain.—The first track is laid from Helena, Mon., 8 miles.

Marietta & North Georgia.—Extended north to the North Carolina line, 3 miles.

Minnesota & Northwestern.—The *Dubuque & Northwestern extension* of this line is completed by laying 58 miles in Iowa.

Missouri Pacific.—The *St. Louis & Emporia Branch* is extended from Kincaid, Kan., west to Colony, 12 miles.

Northern Pacific.—The *James River Valley Branch* is extended from Lamoure, Dak., southward to Oakesdale, 30 miles.

Ohio River.—Completed to a point thirty-five miles north of Point Pleasant, W. Va., an extension of 11 miles.

Puget Sound & Gray's Harbor.—Track laid from Little Skookum, Wash. Ter., southwest 6½ miles.

This is a total of 292½ miles on 17 lines, making 4,554 miles reported so far this year. The new track reported to the corresponding date for 15 years has been :

Miles.	Miles.	Miles.			
1886	4,554	1881	5,639	1876	1,875
1885	1,870	1880	4,388	1875	986
1884	2,932	1879	2,739	1874	1,363
1883	4,947	1878	1,635	1873	3,075
1882	8,314	1877	1,688	1872	5,673

This statement covers *main track only*, second or other additional tracks and sidings not being counted.

NEW PUBLICATIONS.

The *New England Railroad Guide*, heretofore published by Price, Lee & Co. at New Haven, Conn., has been sold by them to J. A. & R. A. Reid, of Providence, R. I., and will hereafter be issued in that city as the *Consolidated Railroad Guide and Gazetteer*. It is a local guide for New England, giving also some of the important roads in New York and New Jersey.

The *Railway Section Foreman* is a paper recently started and is published monthly at Mt. Auburn, Ia., by Messrs. Brown, McIntrie & Co. The name of the paper is well chosen and sufficiently indicates its scope and purpose. The current number (No. 7, for October) contains original and selected articles on track and kindred topics and a variety of correspondence giving local and personal news of interest. The present proprietors intend to form a stock company, to be called the *Railway Track Publishing Company*, with a view to interesting as many persons as possible as stockholders in the paper.

The Theory and Practice of Surveying. By Prof. J. B. Johnson, C. E., of Washington University. John Wiley & Sons: New York.

On the whole this is the best treatise on surveying that we know of, although its merit is very unequal, and it bears the marks of hasty and superficial preparation, like so many other professional text-books. Nevertheless, in some respects it is very decidedly ahead of any other before the public. It is not entirely the work of one hand, chapters on mining surveying and city surveying having been written by those directly engaged in such work. In the good-sized volume of some 680 pages about 170 are devoted to the instruments, in-

cluding the planimeter, barometer and plane table. Only 50 pages are devoted to land surveying proper, 40 more to topographical and stadia work (very well done), 10 pages to the purely surveying work of railroad surveys (not so entirely commendable), 60 pages to hydrographic work and as much more to mining and city work, 30 pages to "measurement of volumes" (earthwork), which hardly belongs in the book and which is open to some criticism for what it does not say rather than what it does say, and 140 pages to geodetic work. This, with a short chapter on mapping and some useful appendices and tables, make up the work. It is a very good text-book in its way, so good that it is a pity it is not better.

Topographical Drawing and Sketching, including Applications of Photography. By Lieut. Henry A. Reed, U. S. A., Assistant Professor of Drawing, United States Military Academy. John Wiley & Sons: New York.

The field covered by this admirably prepared and elegantly printed volume is more the preparation of military or other maps of an elaborate character than railroad or other working maps. For this reason it is less useful as a general reference book than it might be, but as a text book on mapping for students it would be difficult to prepare anything better. Every student should be taught the art of finished mapping more thoroughly than is customary. It will have the effect of increasing the quality and still more the appearance of all such work which he does at merely nominal cost for extra labor, and Lieut. Reed has beyond question prepared the best book for giving such instruction as yet published in this country.

We notice one statement on page 4 which we know to be erroneous; one declaring that "on account of the play of the joints and of the axle" rolling parallel rulers are "not suitable for accurate work." Of the common short rulers of the shops this may be true enough, but a well-made 18-in. parallel ruler is not only by much the most convenient, but by much the most accurate way of transferring parallel lines, and for railroad work especially is to be greatly preferred to any other.

Among the devices for section lining likewise we are surprised not to see mentioned one of the neatest of all devices for work of this kind—a ruler having rectangular shoulders at the end just a little longer than the edge of the accompanying triangle. By sliding each one of these in succession downward by the amount of the play, an exact equidistance is secured in very simple way and with substantial saving of time. By regulating the play, the spacing of the lines can be varied at will.

A relic of barbarism from past ages which we regret to see in so fine a work is the placing of large numbers of small cuts on large folding plates at the end of the work, without any real necessity for so doing and much to the inconvenience of the student, especially as the titles to many of the cuts are quite unnecessarily omitted, requiring reference to the body of the book to find out what they are supposed to represent.

TRADE CATALOGUES.

Catalogue of the Sheffield Velocipede Car Co., Three Rivers, Mich.

The artistic spirit of the age has to find embodiment even in the brief pamphlet necessary to present the limited but meritorious lists of specialties of this company, the best known of which is their three-wheeled hand car, which, for its purpose, seems unlikely to be very materially improved on. A number of different forms are now constructed, as well as some other specialties, which, as we say, are here very tastefully described.

The Brake Test Diagrams.

We give this week, in the accompanying inset sheet, the first installment of what is unquestionably the most complete record of the actual performance of power brakes in long trains which has ever been obtained. In this week's inset the record diagrams are given of all the "No. 1 stops," or those made from a speed of 20 miles per hour on a level grade. Next week we shall follow with a similar but larger sheet, showing all the "No. 2 stops," or those made from a speed of 40 miles per hour on a level. Besides these, there were made the "No. 3" and "No. 4" stops, which were at 20 and 40 miles per hour respectively on a down grade of 55 ft. per mile. These four stops were made in succession in each run of each train, one after another.

Next week we shall also give the tabulated official record of the initial speed and distance run in each of the No. 1 and No. 2 stops, with our computation of the actual efficiency of the brakes in per cent. of the retarding force to the load on the braked wheels. The previously published records are, for reasons repeatedly explained, full of unavoidable errors, especially in the important detail of the initial speed, and an adequate idea of the actual efficiency shown can only be obtained from the computed per cent. of efficiency referred to, even if the records of distance run and speeds be correct.

The computations referred to will not be official, inasmuch as they will be subject to correction by the brake committee should any errors in them be discovered; but as they have been carefully checked, we believe that no errors of any moment will appear in them. It appears preferable that the tabulated data of Stops Nos. 1 and 2 should appear together. Therefore, we content ourselves this week with explaining what the diagrams are and what they show.

Each of the diagrams given consists of two parts :

1. A direct photographic reproduction (one-third of the original size) of the original record diagram taken in the dynamometer car.
2. A constructed diagram, drawn on the original sheets above the original machine record from data furnished by it, to represent the efficiency of the brakes during the stop, or

the rate at which the energy of motion was destroyed. This also is in effect an original record, since it follows it precisely, but it is reconstructed in a different and clearer form.

The lines on the diagrams which belong to the first class (original records) are these :

(A). The base or zero line, drawn on the diagram paper, as it is drawn slowly forward by the machinery by a separate pencil.

(B). The irregular MM line drawn by the pencil connected with the dynamometer spring, which indicates the tension or compression acting in the draw-bar between the tender and first car. If the line is above the zero base-line it indicates tension, or that the engine was pulling the train; if below it, compression, or that the train was pushing on the engine. Thus it affords the means of determining throughout the stop what was the comparative efficiency of the engine and tender brakes.

(C). The time or speed record, given by electrically recorded dots at 5 seconds interval along a separate line, which have been transferred for engraving to the base line, and will be seen drawn upon it. (Some few have been lost in engraving.)

(D). The beginning and end of every stop, as electrically signaled from the engine. This also was recorded on a separate line, but for constructing the diagrams was indicated by long vertical lines at the beginning and end of each stop.

(E). The time of application of the brakes on the middle car was accurately recorded by an apparatus on that car, and has been transferred to these diagrams by a mark shown thus—M—along the base line. The time in seconds from the signal to the rear car that brakes had been applied on the engine to the time when the brake was seen to go on the rear car was also noted and the record transferred to these diagrams marked thus—R. In many of the stops these records were imperfect or not taken at all, so that they do not always appear.

(F). The distance run is an actual measurement from a roll of stakes, merely checked (and some few important errors discovered) by the diagram records.

These are the autographic records, and before explaining the constructed diagrams, which are the most conspicuous feature on the sheet, we may explain some features of the dynamometer record.

The stop begins in all cases at the right of the diagram. The engine was then always pulling with more or less force; with how much may be read from the diagram by a vertical scale of 18,000 lbs., or 9 tons, per inch (on the original, 6,000 lbs. per inch). On the signal to apply brakes the throttle was instantly closed, and we should expect, therefore, that the traction would instantly fall to zero, but it will be seen that this was never the case. By the combined effect of the steam left between the throttle and the piston, the evaporation of any entrained water in the steam chest and pipes; the re-evaporation of any condensed steam in the cylinders (all this steam, of course, being more or less superheated as the pressure fell, and expanding and expanding as long as there was any left to expand) a very considerable amount of work was done by the engine (three different ones were used) for several strokes after steam was shut off, with an economy of steam no doubt which would make any road the envy of its neighbors if it could be habitually realized. It was made entirely certain that the throttles did not leak appreciably, yet it will be seen that this effect was invariably apparent for from 50 to 200 ft. after steam was shut off, despite the action of the driver brakes to counteract it.

The engine machinery having been once brought to a state of equilibrium, however, it will be apparent that, whatever the absolute efficiency of the brakes as a whole, if the engine brakes were retarding the engine, and the train brakes retarding the train, at the same rate, there would be neither push nor pull on the dynamometer draw-bar, but the traction line would fall down to the zero base-line and remain on it during the stop. In no case does this occur, even approximately.

If, on the other hand, the engine brakes are acting decidedly more efficiently than the train brakes, the engine will push back against the train, and the traction line, which, in the beginning, indicated tension, will fall below the zero line, indicating compression. In every one of the diagrams this takes place, and in most of them, after an inexplicably long interval of 5 to 10 or more seconds, the driver brakes take hold with intense vigor, long before the train brakes have begun to act effectually.

If then, later in the stop, the car brakes "get a good hold" or the driver brakes weaken, or both, the train will pull back on the engine and the traction line go back to tension, or above the base line. This occurs in all the Westinghouse and in many of the Eames stops.

The buffer brakes, since they derive their power from compression of the drawbars, necessarily must have the engine holding back against the train (in other words have the car brakes less efficient than the engine brakes) or they will not act at all. Hence, after the brakes begin to act, they all show considerable and continuous compression.

The average compression or tension during the stop, or various parts thereof, was accurately determined by planimeter measurements in the usual way, and is recorded in tons (2,000 lbs.) of compression (or tension) on the diagrams.

We come now to the constructed efficiency diagram, shown in the net work of squares just above the traction record, and drawn on the same zero line as a base-line.

The precise nature of this diagram we can best explain, so that every intelligent man can at once understand it, in this

way: Turn the sheet upside down. The solid line running across each diagram is now *the profile of an up-grade* which would have brought the train to a stop, or down to any given speed, in precisely the same distance and in the same time and the same way as the brakes actually did.

If the action of the brakes had been precisely uniform from beginning to end of the stop, a grade to imitate its effect should be a straight grade, like those shown by the long, straight dotted line across each diagram. If the brakes took hold badly at first and better and better toward the end, as in most cases they did, a grade to imitate their effect should be an easy one at first, and grow steeper and steeper toward the end, as is the case with most of them. If the action of the brakes was irregular, taking hold and then letting go somewhat, the "grade" should also be irregular, as it is in some of them.

If we wish to determine what length the stop would have to be had the brakes been as efficient throughout as they were during the latter end of the stop, we have only to prolong the final "grade" down (or up) to the point A, where we strike the level at which our "grade" starts. This has been done on every one of these diagrams, and the rates in per cent. (1 per cent. = 52.8 ft. per mile) are shown, first for an average grade, which would have stopped the train in the same distance, but not in just the same way as the brakes did, and secondly, of the grade corresponding to the efficiency of the brakes toward the end of the stop. These percentages also show the retarding effect of the brakes in lbs. per 100 lbs. of total weight of train. The more satisfactory basis of comparison, however, is in lbs. per 100 lbs. of load on braked wheels, which will appear in our tabular records.

The vertical lines of the diagram show distances of 100 ft., starting from the beginning of the stop, and hence leaving a fractional distance at the end. The horizontal lines are for speeds of 5, 10, 15, 20 and 25 miles per hour. They are not spaced equally, however, but according to the energy represented by that velocity. A train moving at 20 miles per hour has four times as much stored energy or momentum to be destroyed by the brakes as one moving at 10 miles per hour, and that again as one moving at 5 miles per hour. Consequently, the 5-mile line is very close to the zero baseline, and the others are at increasing intervals apart.

The diagram was constructed thus: The dynamometer paper being moved at 2 ft. per mile, and check-marks being electrically recorded on it at 5 second intervals, a scale of 30 parts per inch reads off the speed in miles per hour during that 5 seconds. When the speed is decreasing during a stop these marks come closer and closer together on the paper. The space between each was read, a perpendicular erected in the middle of each space and the energy corresponding to that speed in vertical feet of potential lift laid off by a uniform arbitrary scale. The efficiency line was then passed through these points without correction. In a few cases where corrections seemed needed they have been indicated by a dotted line, but the solid line is the actual uncorrected record.

Some irregularities of the diagram are due to the effect of slack. There being several feet in the train, and the record being that of the front car, a sudden increase of driver brake efficiency could check back the front cars and cause a great apparent retardation which would be lost in the next five seconds by the whole train crowding upon it when the slack came all out.

TECHNICAL.

Engineers' Club of Philadelphia.

A regular meeting was held in Philadelphia, Oct. 2, President Washington Jones in the chair; 31 members and 1 visitor present.

Prof. L. M. Haupt read some extracts from a paper by Mr. Milne, Institution of Civil Engineers, entitled "Construction in Earthquake Countries," with its discussion. The results were obtained from careful seismic surveys made in Japan, and led the author to state that the safety of a building depended primarily upon its inertia, and secondarily upon its foundation being made free, either by using a bearing of cast iron shot, or of troughs filled with sand. A peculiar phase of earthquake phenomena, not hitherto observed, was the much greater disturbance at the surface of the ground over that at the bottom of a pit only 10 ft. deep. As to the site of a building, solid and high ground was always to be preferred.

Prof. Haupt also exhibited some photographs of Mr. J. Lesley Corbett's Improvements in Solar, Mining and Engineers' Transits, which he has so ably adapted to meet the numerous and complicated requirements of the various subdivisions of the profession. This instrument, which is at once stadia, graduator, transit, alt-azimuth, solar and level, was made by the Messrs. W. & L. E. Gurley, Troy, N. Y., in 1883-84.

Mr. Oliver B. Harden read a paper upon the reduction of Maps by Photography—the method employed by the second Geological Survey of Pennsylvania, on accounts of its accuracy, quickness and cheapness as compared with other methods of reduction.

He described the character of the maps so reduced and their scales, exhibiting reductions of mine maps, the alignment map of the Pottsville & Mahanoy Railroad, and the maps of the Philadelphia Water Department Survey, calling attention to the excellent character of the prints made by Messrs. Julius Bien & Co. of New York.

He said the only element of error was the contraction of the sensitive paper, which, however, was provided for in reduction. There is no error due to distortion by the lens. The accuracy of reduction depends in a great measure on lining the camera at right angles to the map.

This method of reduction shows a saving of 40 per cent. over other methods when a proof copy only is needed, or, where the map is wanted on tracing paper, about 30 per cent.

The Secretary presented for Mr. John Graham, Jr., an illustrated description of the Horizontal Turbines at Willimantic. The objects of the horizontal arrangement were to avoid complication of gearing and loss by friction from weight and pressure on step, and to attain greater power from available head of water. Two sets of turbines, each operating two pumps, are placed upon connected horizontal shafts, revolving in cast-iron casings to which the water is admitted through the iron inlets 6 ft. in diameter.

The special features of this turbine arrangement are as

follows: Two movable or revolving wheels—the blades of which are bronze—44 in. in diameter are secured to a horizontal shaft placed 9 ft. above the tail water or lower level. They are made to turn to the right and left, but placed in such a manner in relation to each other as to cause the shaft to revolve by the action of both turbines. The mechanical arrangement is such as to admit, by simply removing six coupling bolts, of operating the pumping machinery with one turbine.

In this case, the end thrust caused by the want of counter-action of the second turbine is taken up by glass disks surrounded with oil.

Another feature is the mode adopted for controlling the action of the water by means of sliding gates placed in front of the guide wheels.

Looking over records of Jonval turbines constructed, with the exception of Geyelin's duplex Jonval turbines, it will be found that the gates heretofore used were placed below the turbines, very often at the outlet of the draft tubes, requiring, for proper construction, foundation-plate resting upon a packed floor.

The Secretary presented, for Mr. W. E. Hall, a review of the Freight Brake Trials at Burlington. Mr. Hall's conclusions were not favorable to the buffer brakes.

Progress on the New Croton Aqueduct.

The second meeting between two tunnels in the contract of Brown, Howard & Co., on the new Croton Aqueduct took place yesterday morning, when the wall of rock between the south tunnel of Shaft Zero and the north tunnel of Shaft No. 1 was blown down with dynamite, making one continuous tunnel from Croton Lake to a long distance south of Shaft No. 1. About 11 o'clock on Thursday night, the long 12-foot drill from the heading in Shaft No. 1 pierced the wall near the ceiling in Shaft Zero's tunnel, and this was received with a cheer by the men on both sides, the drill having gone through a mass of rock 8 ft. in thickness. A short time afterward a similar drill from the heading of Shaft Zero pierced through into No. 1's tunnel. Then the drills were withdrawn, and the two holes found to be on a direct line—the two tunnels, meeting at a distance of half a mile from either shaft, had joined exactly, proving very accurate work on the part of both the engineers and the contractors.

Shaft No. 1 is the deepest along the line, being 375 ft. deep before the tunnels start off in a north and south direction. The two drill holes were charged with dynamite cartridges, and that of No. 1 was exploded by the battery at No. 1's house. The concussion exploded the cartridge inserted by the men in Shaft Zero, and quite a large hole was made. This was effected at about 5 o'clock yesterday morning. Then there commenced a rivalry among the men to be the first to go through the opening. All accounts agree that Edward Carey and P. Clark, two of Zero's men, were the first to go through the hole, and very soon thereafter whites and blacks, Irishmen, Italians, and negroes were mingling together in a fraternal way. There was no fighting or jostling, as it had been feared there would be, but all seemed anxious to celebrate a great engineering event in a sensible manner. Wires for telephoning and blasting were then strung through the opening, and the connection was completed.

There are still about 250 ft. of bench to be taken out on either side of the opening. Shaft Zero's tunnel had been run 3,335 ft. from the Croton Dam, where it commences. The length of the tunnel from Shaft No. 1 to where the headings met was 1,522 ft., but this shaft has, or rather had, to work both ways—toward Zero and No. 2—and had accomplished about the same amount of work, the number of feet thus far excavated toward No. 2 being 1,314. Although Shaft Zero has completed its tunneling, it has a large amount of work on hand in making excavations for the immense gatehouse to be built at the lake end. They are there blasting out the side of a high mountain. It looks like an endless job, but every blast does immense execution and huge blocks of stone are carted away continually by the army of men employed.—*New York Times*, Oct. 16.

Steel Castings.

The progress of steel manufacture during recent years is exemplified in many ways at the Liverpool Exhibition, but perhaps the progress of no one department is more strikingly illustrated than that of steel casting, this illustration being afforded by the exhibits of Messrs. John Spencer & Sons, of Newburn Steel Works, Newcastle-on-Tyne, and No. 139 Cannon street, London. The most prominent feature on their stand is an 8-ft. steel driving-wheel centre, which has been cast for the Great Northern Railway Co. This is an excellent casting, and shows how steel is completely taking the place of wrought iron for such purposes, thus doing away with the many welds necessary in wrought-iron wheels. There is a striking contrast between this large wheel centre and the small one for a tram engine, as also between the cast-steel crank axle for a tram engine and that for one of the Great Western engines. These cast-steel crank shafts were first used on the North British Railway, and one of them has now been running for more than six years over one of the steepest and most crooked main lines in the country, and as yet is said to show no sign of weakness. Among the milder steel castings are shown crank webs manufactured under Mr. J. Dickinson's patent. One large crank web has been slotted in three directions, and shows the perfect soundness of this material, not a flaw being visible. Mr. Dickinson, on his stand, shows a well-finished three-throw marine crank shaft, the webs of which are cast by Messrs. Spencer of their mild steel. We understand that the firm have made similar crank webs for upwards of 46 vessels with collectively 4,200 horse-power indicated.

Another interesting exhibit is a group of Newburn homogeneous iron castings, which show a very mild and soft material. They consist chiefly of ship fittings, spars, and ornamental open work. These castings are not annealed, yet they are bent and twisted cold. As most of our readers are aware, Messrs. Spencer are the makers of Westmeyers Smith's anchors, upward of 900 of which have been made, ranging in weight from 6½ tons down to 22 lbs. for boats' use. Messrs. Spencer are also the makers of Penman's cast-steel chain links. These chains give a high tensile resistance, which in several instances is stated to have been more than 200 per cent. over proof strain, and at the same time having an elongation exceeding that of the best cable iron.

Messrs. Spencer also exhibit a model of a cast-steel solid crank shaft 13 in. in diameter, many of which have been made. For shafts of large size no doubt this is the material from which they should be constructed. Cast near to the finished size, they are thus free from most of the mechanical and chemical evils of huge ingots, which are afterward subjected to treatment under the hammer. That the mechanical test of tension, bending, and torsion are equal, if not superior, to the material of the forged shafts is clearly manifest in the tests submitted, and we believe the chief bodies who are responsible for the insurance of ships are satisfied with the results. The superiority to ordinary iron shafts has been fully demonstrated, and there are hardly any iron shafts made that would conform to the rigorous experiments demanded of steel.—Iron.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Baltimore & Ohio, annual meeting, at the office in Baltimore, at 10 a.m., Nov. 15.

Massachusetts Central, special meeting, in Boston, Oct. 30, to vote on the proposed lease of the road to the *Boston & Lowell*.

Peoria, Decatur & Evansville, special meeting, in Peoria, Ill., Dec. 20.

Richmond & West Point Terminal Co., special meeting, in Richmond, Va., Nov. 19.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Baltimore & Ohio, 4 per cent., semi-annual, on Main Stem stock and 5 per cent., semi-annual, on Washington Branch stock; both payable Nov. 1, to stockholders of record on Oct. 16. The company drops from 5 to 4 per cent.

Boston & Providence, 4½ per cent., semi-annual, payable Nov. 1, to stockholders of record on Oct. 16. This company increases its dividend from 4 to 4½ per cent.

Cincinnati, Hamilton & Dayton, 3 per cent., quarterly, payable Nov. 10.

Northern (New Hampshire), 3 per cent., semi-annual, payable Nov. 1.

Pullman's Palace Car Co., 2 per cent., quarterly, payable Nov. 15, to stockholders of record on Nov. 1.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Association of Railroad Trackmen of North America* will meet at Council Bluffs, Ia., on Thursday, Nov. 25.

The *Master Car-Builders' Club* holds its regular meetings at the rooms, No. 113 Liberty street, New York, on the third Thursday in each month.

The *New England Railroad Club* holds its regular meetings at its rooms in the Boston & Albany passenger station in Boston, on the second Wednesday of each month.

The *Western Railway Club* holds its regular meetings at its rooms in Chicago on the third Wednesday in each month.

Foreclosure Sales.

The *Lake Erie & Western* road will be sold at Muncie, Ind., on Nov. 18 next, under the decrees of foreclosure granted by the United States Circuit Court. Mr. John A. Henry, as special master, will sell the line from Fremont, O., to Bloomington, Ill., with the branches, 362 miles, and Mr. W. F. Goodspeed, as special master, will sell the Sandusky extension of 25 miles, from Fremont to Sandusky, O. The division of the rolling stock is now under consideration by the Court and will be announced at the time of sale.

The *Texas Trunk* road was sold in Dallas, Tex., Oct. 6, under orders of sale from the District Court, to satisfy a number of judgments held against the company, and was bought in by the bondholders. This is the sixth or seventh time which this road has been sold.

General Time Convention.

On the second day of the meeting last week the new code of uniform train rules, as presented by the Committee, were approved and recommended to the railroads for adoption. The committee was continued, with instructions to prepare a uniform code of telegraph signals, to be submitted at the spring meeting of the convention.

The question of a general adoption of the 24-hour time system was brought up, but was laid over after a short discussion.

The request of the *Car Accountants' Association* for uniformity in the method of making reports of the movement of cars was submitted to the Convention, and the question was referred to a special committee, to report at the next meeting.

It was resolved to adopt through schedules substantially the same as those of last winter. Nov. 14 was agreed on as the date for changes from summer to winter time-tables on through routes.

Brotherhood of Railroad Brakemen.

The Brotherhood of Railroad Brakemen began its third annual convention in San Antonio, Tex., Oct. 16. The Association has been organized only three years, having been founded at Oneonta, N. Y., in 1883, but has now 244 lodges. Some 250 delegates are present at the convention. The convention opened with a street parade and public meeting in the afternoon, at which addresses of welcome were made and responded to. In the evening the delegates attended a ball, given in their honor by the citizens. The business meetings, which are private, began Oct. 19, and are expected to continue about ten days.

Pennsylvania Company Surgeons.

The surgeons in the employ of the *Pennsylvania* Company held their semi-annual meeting in Pittsburgh, Oct. 20. The meeting was largely attended, and was devoted to the discussion of cases arising in practice, their treatment and results, and similar topics. Officers were elected, and it was decided to hold the next meeting in Crestline, O., in May next.

American Street Railway Association.

The fifth annual convention of this Association began in Cincinnati, Oct. 20, with over 100 members present. After the opening exercises the Executive Committee presented a long report, chiefly devoted to a discussion of the labor question. This report was discussed and adopted.

Baltimore & Ohio Employees' Relief Association.

The September sheet of this Association shows payment of benefits during the month to a total amount of \$24,062, as follows:

	Number.	Amount.
Accidental deaths	10	\$9,500
Accidental injuries	273	3,041
Natural deaths	11	4,600
Natural sickness	486	6,185
Physicians' bills	130	725
Total	910	\$24,062

Secretary Barr issues the following: "As there seems to be a misunderstanding as to the right of employees, who may be suspended for a period exceeding 30 days, of retaining their natural death feature in the Relief Association, any member who may be suspended for a period beyond which dues have been deducted can continue his benefits in the natural death feature by remitting to the Treasurer, through any bonded agent of the company, 25 cents for each rate for which he may have been insured; the agent of the company notifying the Treasurer, to whose account the sum so remitted shall be credited, and also notifying the Secretary of the Relief Association, giving the number of party's certificate. Members of the Relief Association will not be deprived of the benefits of transportation at half rates during suspension."

ELECTIONS AND APPOINTMENTS.

Alabama & Tennessee.—The officers of this new company are: President, W. B. Wood; Vice-President, C. G. Smith; Secretary, H. C. Wood. Office at Florence, Alabama.

Annapolis & Baltimore Short Line.—At the annual meeting in Baltimore, Oct. 13, the following directors were chosen: John Glenn, Baltimore; J. Hopkins Smith, New York; E. H. Fennessy, W. C. Haskins, H. P. Underhill, Boston; E. G. Wallace, Portsmouth, N. H.; W. W. Brown, George Burnham, Jr., J. S. Ricker, Portland, Me. The board elected H. P. Underhill President and Treasurer; J. S. Ricker, Vice-President; Dorsey Linthicum, Secretary.

Baltimore & Ohio.—The following order from General Manager Bradford Dunham is dated Baltimore, Oct. 16: "Mr. Wilbert Irwin is this day appointed Division Superintendent, in charge of the Philadelphia Division, with headquarters at Philadelphia, vice Mr. D. Connell, assigned other duties."

Boston & Lowell.—Mr. F. L. Pomeroy has been appointed Assistant to the President, with office in Boston. He was formerly General Freight Agent of the West Shore road.

Central Iowa.—At a meeting of the board held last week Charles Fairchild and A. B. Stickney were chosen directors in place of Elijah Smith and Alfred Sully, resigned. The board then elected A. B. Stickney President in place of Elijah Smith, resigned. Mr. Stickney is President of the Minnesota & Northwestern.

Central, of New Jersey.—The United States Circuit Court has appointed John S. Kennedy and Joseph S. Harris, Receivers of this road, on application of some of the bondholders. Mr. Kennedy is Vice-President of the company, and Mr. Harris is President of the Lehigh Coal & Navigation Co. The appointment dates from Oct. 15.

Central Traffic Association.—Mr. W. B. Shattuc has been chosen Arbitrator for the Passenger Department in place of E. P. Wilson, resigned. Mr. Shattuc is at present General Passenger Agent of the Ohio & Mississippi, and was for a number of years on the New York, Pennsylvania & Ohio.

Chicago, Kansas & Nebraska.—Mr. George D. Martin is appointed Car Accountant for this company, with office at St. Joseph, Missouri.

Chicago, Milwaukee & St. Paul.—Mr. Clif. P. Kennedy, Traveling Passenger Agent, left the service of this company on Oct. 15. Correspondence relating to passenger and ticket business for the territory south of the Ohio River may be addressed to headquarters at Milwaukee, Wis., or to J. G. Everest, General Southern Passenger Agent, No. 63 Clark street, Chicago.

Chicago & Northwestern.—Mr. S. Sanborn, Assistant General Superintendent, whose office has been heretofore at Winona, Minn., will be transferred to Chicago to take the place of Mr. W. S. Mellen, who has gone to the Wisconsin Central.

Cincinnati, Sandusky & Cleveland.—At the annual meeting in Sandusky, O., Oct. 20, the following directors were chosen for three years: J. H. Thomas, Springfield, O.; J. S. Farlow, Boston; J. R. Maxwell, New York. The board re-elected J. S. Farlow President; N. W. Pierce, Vice-President; J. L. Moore, Secretary and Treasurer.

Colorado Midland.—Mr. D. B. Robinson has been appointed General Manager of this road. Mr. Wm. Fuller has been appointed Mechanical Superintendent. Mr. Robinson was formerly General Manager of the Mexican Central, and more recently of the Atlantic & Pacific.

Columbus, Hocking Valley & Toledo.—Mr. J. Lee Humphreville has been elected a director and Second Vice-President of this company in place of Mr. J. H. Wade, resigned.

East Line & Red River.—This company, which is controlled by the Missouri Pacific, has elected J. A. Baker, President; J. C. Brown, Vice-President; W. H. Abrams, Secretary; E. W. Taylor, Assistant Secretary and Claim Agent.

Evansville & Terre Haute.—At the annual meeting in Evansville, Ind., Oct. 18, the old directors were re-elected.

Fitchburg.—Mr. J. F. Adams is appointed Superintendent of the Western Division, with office at Fitchburg, Mass., in place of W. I. Fox, resigned. Mr. Adams is a son of Mr. John Adams, Superintendent of the road, and has been Claim Agent for some time past.

Housatonic.—Mr. Henry A. Bishop, heretofore Superintendent, has been appointed General Superintendent, to date from Oct. 11. He will have charge also of the Danbury & Norwalk road, lately leased, which will be hereafter known as the Danbury & Norwalk Division. His office will remain at Bridgeport, Conn. Mr. Charles M. Crawford is appointed Superintendent of the Danbury & Norwalk Division, with office in South Norwalk, Conn. Mr. Clark P. Lane is appointed Trainmaster, with office in Bridgeport, Conn., in place of C. W. Wood, resigned.

Lake Erie & Western.—At the annual meeting in Bloomington, Ill., Oct. 13, the following directors were chosen for three years: Calvin S. Brice, Lima, O.; P. K. Green, E. H. R. Lyman, Nelson Robbins, New York.

Louisville & Nashville.—Mr. Dade Sams is appointed Traveling Freight Agent, with headquarters at Birmingham, Alabama.

Mexican Central.—General Manager E. W. Jackson will, it is stated, be appointed Acting Traffic Manager also from Nov. 1, in place of Henry C. Barlow, resigned. The several agencies of the company in the United States, including its connections with other roads in respect to rates and divisions, will be placed in charge of a new official, who will be called the International Freight and Passenger Agent. The company's agencies at New York and Chicago will be continued, and several new agencies will probably be established at other points.

Michigan Cen'ral.—General Freight Agent A. Mackay has issued the following circular: "The Assistant General Freight Agents and General Eastern Freight Agent of this company will have supervision under instructions from the General Freight Agent of freight traffic coming to this road at points within the territory assigned below: A. W. Street, Assistant General Freight Agent, Chicago, in charge of Main Line, New Buffalo to Chicago, inclusive, also Joliet Division. C. J. Hupp, Assistant General Freight Agent, Detroit, in charge of Main Line, Detroit to Three Oaks, inclusive, Air Line, South Bend Division, South Haven Division, Grand Rapids Division; also traffic received from connecting railroads at Lansing, North Lansing, Owosso, Pontiac, Oxford and Port Austin Crossing. Michigan Air Line Crossing, and Chicago & Grand Trunk Crossing. W. L. Beaman, Assistant General Freight Agent, Bay City, in charge of Mackinaw Division, Saginaw Division, south to Leslie, inclusive, Bay City Division, south to Norris, inclusive, excepting traffic coming from connecting railroads at Lansing, North

Lansing, Owosso, Pontiac, Oxford and Port Austin Crossing, Michigan Air Line Crossing, and Chicago & Grand Trunk Crossing. John Crampton, General Eastern Freight Agent, Buffalo, in charge of all lines in Canada, also Buffalo, Black Rock, Suspension Bridge, and the Michigan, Midland Division, St. Clair to Lenox, inclusive. Agents will report and receive instructions from the respective officers in charge of the territory assigned as above."

Minneapolis & St. Louis.—At the annual meeting in Minneapolis, Oct. 5, the old officers and directors were re-elected.

New York Central Sleeping Car Co.—President W. S. Webb announces that Mr. T. H. Munsell, heretofore Superintendent of Construction and Repairs, having tendered his resignation, Mr. T. A. Bissell is appointed Manager of the Buffalo shops.

General Superintendent Flagg issues the following, dated New York, Oct. 1: "Mr. A. F. Hatch, heretofore District Superintendent at Lake Shore station, Chicago, having tendered his resignation, the same is hereby accepted. Mr. W. O. Chase, formerly Assistant at the above-mentioned station, has been appointed District Superintendent."

New England General Passenger Agents' Association.—At the annual meeting in Boston, Oct. 20, the following officers were elected for the ensuing year: President, F. H. Kingsbury, Cheshire Railroad; Vice-President, J. R. Watson, Fitchburg Railroad; Secretary, C. A. Waite, Boston & Maine. The Executive Committee is: E. C. Watson, Connecticut River; O. H. Briggs, New York, Providence & Boston; C. H. Foy, Portland & Ogdensburg.

New York, Rutland & Montreal.—Mr. F. A. White having resigned as Superintendent of Construction, that office has been abolished.

Ohio & Mississippi.—At the annual meeting in Cincinnati, Oct. 14, the following directors were chosen: John F. Barnard, St. Joseph, Mo.; E. W. Whittaker, St. Louis; J. M. Tracy, Springfield, Ill.; Briggs S. Cunningham, Cincinnati; F. P. Dimpf, Robert Garrett, Baltimore; S. M. Felton, Jr. Baring Gould, A. Gracie King, Wm. Libbey, George C. Magoun, George R. Morrison, James H. Smith, New York. The new board has a majority representing the English interest. The board elected J. F. Barnard President; W. W. Peabody, General Manager. Mr. Peabody tendered his resignation, to take effect Nov. 1: it was accepted, and it is understood that President Barnard will act as General Manager also.

Oregon Railway & Navigation Co.—The following circular from Manager C. H. Prescott, is dated Portland, O., Oct. 11: "S. B. Willey has been elected Comptroller of this company, vice C. J. Smith, resigned. His office will be at Portland, Oregon, and his appointment will take effect this date."

Pennsylvania Co. Surgeons' Association.—At the half-yearly meeting in Pittsburgh, Oct. 20, officers were elected as follows: President, Dr. J. H. Tressel, Alliance, O.; Vice-President, Dr. E. W. Lee, of Chicago; Secretary, Dr. J. J. Buchanan, Pittsburgh; Executive Committee, Dr. A. W. Ridenour, Massillon, O.; Dr. G. W. McGarvon, Van Wert, O., and Dr. S. S. Thorne, Toledo, Ohio.

Pittsburgh & Lake Erie.—Mr. Daniel Hardy has been appointed Trainmaster of this road, in place of Mr. D. C. Bachelor, resigned. Mr. Hardy was recently with the Mississippian Pacific.

Profile & Franconia Notch.—This company, whose road is controlled by the Boston & Lowell, has elected officers as follows: President, John H. George, Concord, N. H.; Clerk, Samuel N. Bell, Portsmouth, N. H.; Treasurer and Superintendent, C. H. Greenleaf, Bethlehem, New Hampshire.

Roadmasters' Association of America.—At the convention in St. Louis last week the following officers were chosen: President, John W. Craig, Charleston & Savannah; First-Vice-President, C. E. Jones, Chicago, Burlington & Quincy; Second Vice-President, J. H. Preston, Renova, Pa.; Secretary, D. H. Lovell, Renova, Pa.; Treasurer, Thomas Adamson, Aurora, Ind. The next meeting will be held in Cleveland the second Tuesday in October next.

St. Louis Bridge.—Mr. N. W. Eayrs is appointed Assistant Superintendent of Structure, to date from Nov. 1. He was recently on the New York & New England and formerly on the Troy & Greenfield.

St. Louis & Hannibal.—Mr. Richard Whalen has been appointed Master Mechanic of this road, vice Mr. E. C. Gibson, resigned. Appointment took effect Oct. 11.

Texas, Topolobampo & Pacific.—At the annual meeting in Boston, last week, the following directors were chosen: William Windom, A. M. Reid, Elisha A. Buck, Frederick O. Prince, John H. Rice, Benjamin F. Butler, George W. Simmons, E. W. Cushing, Walter C. Gilson, Ulysses S. Grant, Jr., Albert K. Owen, W. K. Rogers, Alexander R. Shepard, D. L. Yulee, J. E. Brown, Ignacio Pombo, F. M. de Prida, Juan Dublan. The board elected William Windom President; Elisha A. Buck, Vice-President; John H. Rice, Secretary and Treasurer; Edward S. Herrera, Assistant Secretary; F. M. de Prida, General Agent in Mexico; Charles Albert Prince, Clerk.

Wabash, St. Louis & Pacific.—Mr. Frank Tyrrell is appointed Master Mechanic of the Western Division, with office in Moberly, Mo. He was recently General Foreman of the Fort Wayne shops.

West End & East Point.—The incorporators of this Georgia company are: R. H. Caldwell, Lewis Cook, G. H. Culberson, O. I. Culberson.

Western & Atlantic.—General Freight Agent Joseph M. Brown issues the following circular dated Oct. 5: "Taking effect this day, the following appointments are announced: Mr. W. H. Trezevant is promoted from the position of Southeastern Agent, and becomes General Southeastern Agent of this company, with headquarters at Atlanta, Ga. Mr. George M. Brown is promoted from the position of Soliciting Agent in Florida, and becomes Southeastern Agent for the territory extending from Atlanta to Charlotte, N. C., Charleson, S. C., Savannah, Ga., and Macon, Ga., inclusive. His headquarters, until further notice, will also be in Atlanta."

Western Union Telegraph Co.—The new board met in New York, Oct. 20, and re-elected the old officers, as follows: President, Norvin Green; Vice-President and General Manager, Thomas T. Eckert; Vice-Presidents, John Van Horne, George J. Gould, Robert C. Clowry; Acting Vice-President and Auditor, J. B. Van Every; Secretary, A. R. Brewer; Treasurer, R. H. Rochester; Attorney, George H. Fearon; Executive Committee, Norvin Green, Thomas T. Eckert, Jay Gould, John J. Terry, Russell Sage, John Van Horne, Alonzo B. Cornell, Samuel Sloan, Sidney Dillon, George J. Gould, Robert C. Clowry.

Wichita & Trinidad.—The directors of this new company are: R. J. Simpson, Anthony, Kan.; J. Broaddus, William Kipp, M. Walser, Wichita, Kan.; H. Dalhoff, Edwards, Kan. Mr. William Kipp is President; R. J. Simpson, Vice-President; J. Broaddus, Chief Engineer.

PERSONAL.

—Mr. D. C. Bachelor has resigned his position as Trainmaster of the Pittsburgh & Lake Erie road.

—Mr. E. C. Gibson has resigned his position as Master Mechanic of the St. Louis & Hannibal road.

—Mr. Elijah Smith, of Boston, has resigned his position as President of the Central Iowa Company.

—Mr. W. I. Fox has resigned his position as Superintendent of the Western Division of the Fitchburg Railroad.

—Mr. C. P. Kennedy has resigned his position as Traveling Passenger Agent of the Chicago, Milwaukee & St. Paul road.

—Mr. C. W. Wood has resigned his position as Trainmaster and Assistant Superintendent of the Housatonic Railroad.

—Mr. P. H. Houlihan has resigned his position as Master of Transportation of the St. Louis, Arkansas & Texas road, to take effect Nov. 1, and will remove to Chicago.

—Mr. J. H. Wade, of Cleveland, O., has resigned his position as Second Vice-President of the Columbus, Hocking Valley & Toledo Co. He has also resigned as a director of the company.

—Mr. F. A. White has resigned his position as Superintendent of Construction on the New York, Rutland & Montreal road, the work of rebuilding the line having been substantially completed.

—Mr. W. W. Peabody, who has been for some time President of the Ohio & Mississippi Co., and who was chosen General Manager at the recent election, has tendered his resignation of that position, to take effect Nov. 1 next.

—Mr. W. R. Crumpton has resigned his position as General Superintendent of the St. Louis, Arkansas & Texas road, to take effect Nov. 1. Mr. Crumpton, it is stated, will engage in commercial business in Chicago, giving up railroading altogether.

—Mr. William Fuller, who has just been appointed Mechanical Superintendent of the Colorado Midland road, was for many years Master Mechanic of the Atlantic & Great Western, now the New York, Pennsylvania & Ohio road. Mr. Fuller will have full charge of the construction of the company's shops, which are intended to be very complete.

—Mr. N. W. Eayrs has accepted a position as Assistant Superintendent of Construction of the St. Louis Bridge & Tunnel Co. Mr. Eayrs was recently Engineer of Maintenance of Way of the Western Division of the New York & New England road, and previously held a similar position on the Troy & Greenfield road and Hoosac Tunnel.

—Mr. Joseph K. Sharp, who died in Washington, Oct. 7, aged 60 years, had been for 40 years employed on the Northern Central and its allied lines. He entered the service of the road as brakeman when 20 years old and gradually worked his way up. At the time of his death he was Assistant Trainmaster of the Baltimore & Potomac road.

—Mr. John E. Chamberlin, who died at his home at South Newbury, Vt., Oct. 7, aged 70 years, was formerly an extensive railroad contractor, and did work on many New England roads. His largest and almost his latest work was on the White Mountains extension of the Boston, Concord & Montreal road. He was father of Mr. H. E. Chamberlin, Superintendent of the Concord Railroad.

—Mr. D. B. Robinson, formerly General Manager of the Mexican Central road, and for a year past General Manager of the Atlantic & Pacific, has resigned the last named position to take charge, as General Manager, of the new Colorado Midland road. Before going to Mexico, Mr. Robinson was General Superintendent of the New Orleans, Mobile & Texas, and had previously served on the Central Pacific and the Central Vermont roads.

—Mr. T. A. Bissell, for some time past Superintendent of the works of the Barney & Smith Manufacturing Co., at Dayton, O., has resigned that position to take charge of the shops of the New York Central Sleeping Car Co. at Buffalo, N. Y., as Superintendent of Construction and Repairs. Mr. Bissell has had many years' experience as a railroad man and has a high reputation as a car-builder of ability and experience.

—Mr. James A. Dupee died very suddenly in Lowell, Mass., Oct. 18, aged 65 years. He has been for a year past a prominent business man of Boston, and for 16 years past treasurer of the Hamilton and Appleton manufacturing companies of Lowell. Mr. Dupee has been for a number of years a director of the Vermont & Massachusetts Railroad Co. He was also for some time a director of the old Boston, Hartford & Erie Co., and was President of the company for a short time.

—Capt. John A. Gee has resigned the office of Superintendent of the Atlantic & Danville Railroad, which position he has held for nearly a year, with headquarters at Hicksford. In severing his connection with that road he received highly complimentary letters from the directors, who earnestly requested a withdrawal of his resignation. Captain Gee will, it is understood, accept the position he formerly held with the Richmond & Danville.

—Mr. John Taylor, who represents those English stockholders of the Pennsylvania Railroad Co. who joined in the recent meeting in London, arrived in New York on the "Umbria" Oct. 18. Mr. Taylor has frequently visited this country before, and has taken part in several of the annual meetings of the company. The object of his present visit is to urge upon the management a distribution of the surplus, and the application of the entire net earnings to dividends.

—Mr. John F. Barnard, the new President of the Ohio & Mississippi Co., is a civil engineer by profession, and first began work as an assistant on the Portland end of the Grand Trunk road. He remained on the Grand Trunk for 10 years, and was for four years Chief Engineer of the Carrillon & Grenville road in Canada. In 1869 he went to Missouri as Chief Engineer of the Missouri Valley road, and when that road was merged in the Kansas City, St. Joseph & Council Bluffs he was made Chief Engineer of the consolidated line. In 1872 he was made Chief Engineer and Superintendent of the St. Joseph & Denver City road, but a year later returned to the Kansas City, St. Joseph & Council Bluffs as General Superintendent, and has since held that position. In 1884 he was appointed General Manager of the Hannibal & St. Joseph road also, both lines being controlled by the Chicago, Burlington & Quincy Co. It will be seen that Mr. Barnard has had long experience in the construction and management of railroads. He will act as General Manager of the road as well as President.

—The Buffalo Courier of Oct. 19 says: "The very many friends in Buffalo of Thomas W. Frederick, formerly Master Mechanic of the Buffalo Division of the West Shore, and subsequently General Inspector of the motive power of that road, will learn with sincere sorrow of his death on Oct. 3, at Para, South America, 10 days after his arrival there. He was sent out as the representative of the Westinghouse Air Brake Co., of Pittsburgh, and, after a year's absence, was to return and then go back and take exclusive charge of the

company's interests on that continent. The sad news of his untimely end was not received here until yesterday. Mr. Frederick was only 29 years of age, and was regarded as a young man of rare ability and great promise. He was a graduate of the Lehigh University and spoke several languages, among which was the Portuguese. The Westinghouse Co. realized that the latter advantage would be invaluable to them. In addition to his knowledge of mechanics he was a student of astronomy and a great lover of the fine arts. When appointed Master Mechanic on the West Shore road, he was the youngest man holding such a position in the country. It will be remembered that upon leaving his Buffalo position the employés connected with the Motive Power Department presented him with a fine watch chain, suitably inscribed. Mr. Frederick will be remembered as a most genial man, who enjoyed the good will of all who knew him, and who was held in the highest esteem both in railroad and social circles."

—Mr. Thomas M. Carnegie died at his residence at Homewood, Pa., Oct. 19, of pneumonia, after a short illness. Like his brother, Mr. Andrew Carnegie, he had a remarkable career. He was born in humble circumstances at Dunfermline, Scotland, Oct. 2, 1843, and came to America and went to Pittsburgh with his father, mother and brother in 1847. He was first engaged, when young, in the telegraphic department of the Pennsylvania Railroad Co., where his brother Andrew had been previously employed, and became an expert operator. He was worth \$2,000,000 at the time of his death. In the year 1860, when but 18 years old, he entered into partnership with Messrs. Andrew Kloman & Henry Phipps, Jr., in the operation of a small iron mill, which was erected on the site of the present Twenty-ninth street works, Pittsburgh. In 1865 the firm of Kloman & Phipps consolidated with the Cyclops Iron Co., of which Mr. Andrew Carnegie and Thomas N. Miller were the principal owners. The business was continued under the name of the Union Iron Mills. The firm built the first Lucy Furnace in Pittsburgh in 1871, and in 1873 became partners in the Edgar Thomson Steel Works, by purchasing the interests of the outside and smaller partners. They afterward consolidated their Edgar Thomson Steel Works, Union Iron Mills, Larimer Coke Works, Scotia ore mines, and Lucy furnaces under the firm name of Carnegie Brothers Limited. Mr. Thomas M. Carnegie was elected Chairman on April 1, 1881, which position he held up to the time of his death. He was also an equal holder in all the interests and enterprises of Carnegie, Phipps & Co., Limited, and a large stockholder and director in the H. C. Frick Coke Works and the New York & Cleveland Gas Coal Co. He was also at the time of his death a director in the Keystone Bridge Works. He was for years a director in the Lawrence and Third National banks in Pittsburgh. Some years ago he bought the old Dungeness estate, Cumberland Island, off the coast of Georgia, and there built a magnificent winter residence.

TRAFFIC AND EARNINGS.

Coal.

Coal tonnages for the week ending Oct. 9 are reported as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Anthracite	766,833	787,731	D. 20,878	2.6
Eastern bituminous	270,903	247,343	L. 22,650	9.6
Coke	65,909	43,508	L. 22,401	51.5

The demand for anthracite continues good and the stocks at tidewater are not increasing. Prices are maintained much better than was expected.

The bituminous coal trade is active, and shippers are complaining of a short supply of cars; this, however, is the usual complaint about this season.

Cumberland coal shipments for the week ending Oct. 16 were 70,700 tons. Total to Oct. 16 this year, 1,899,985; last year, 2,181,881; decrease, 281,896 tons, or 12.9 per cent.

Pennsylvania Railroad coal tonnage for the week ending Oct. 16 was:

	Coal.	Coke.	Total.	1885.
Line of road	158,258	69,116	227,374	223,697
From other lines	60,444	625	67,049	109,296

	Total	1886.	1885.
Year to Oct. 16	224,702	69,741	294,443
	6,062,548	2,697,357	8,110,899

Decrease for the week, 38,550 tons, or 11.6 per cent.; increase for the year, 936,854 tons, or 8.7 per cent.

Anthracite Coal Tonnage.

Anthracite coal tonnage for September and the nine months to Sept. 30 is given as follows by Mr. John H. Jones, the Official Accountant, the statement including the entire production of anthracite coal, excepting that consumed by employés and for steam and heating purposes about the mines:

	September.	Nine months.	1886.	1885.
Phila. & Reading	1,084,257	1,166,062	8,110,899	8,133,291
Lehigh Valley	533,112	651,053	4,293,960	4,117,110
Del. Lack. & West.	452,771	522,016	3,615,260	3,428,495
Del. & Hudson Canal Co.	19,832	359,961	2,494,245	2,311,416
Pennsylvania Railroad	322,285	331,182	2,511,884	2,442,176
Pennsylvania Coal Co.	155,751	161,154	974,566	1,012,148
N. Y., E. & W.	55,864	65,775	524,384	440,387

Total 2,896,472 3,259,183 22,535,198 21,785,422

Decrease for the month, 362,711 tons, or 11.1 per cent.; increase for the year, 749,776 tons, or 8.4 per cent. All the companies show decreases for September; all show increases for the year except the Reading, whose tonnage decreased 0.3 per cent., and the Pennsylvania Coal Co., 3.6 per cent.

The actual division of tonnage for the nine months was as follows, comparisons being made with last year and 1884:

	1886.	1885.	1884.
Philadelphia & Reading	36.0	37.3	36.3
Lehigh Valley	19.0	18.9	19.3
Del. Lack. & Western	18.0	15.7	16.9
Del. & Hudson Canal Co.	11.1	10.2	11.0
Pennsylvania Railroad Co.	11.2	11.2	10.7
Pennsylvania Coal Co.	4.3	4.7	4.5
N. Y., Lake Erie & Western	2.4	2.0	1.3

Total 100.0 100.0 100.0

The stock of coal on hand at tide-water shipping points, Sept. 30, 1886, was 518,306 tons; on Aug. 31, 1886, 649,059 tons; decrease, 130,753 tons, or 20.1 per cent., during the month.

Central Traffic Association.

A Chicago dispatch of Oct. 19 says: "Mr. E. P. Wilson, Arbitrator for the Passenger Department of the Central Traffic Association, has rendered an important decision regarding the demands of the Wabash, the Bee Line and the Ohio & Mississippi railroads on tariff rates and differentials on business from St. Louis to New York. The substance of the decision is as follows: First, that tariff rates be maintained by the Wabash upon first-class tickets sold by that company over its Lake Shore and New York Central connections. By its other routes a differential of \$2 may be used. Second, the differential of \$2 on first-class tickets in favor of the Bee Line may remain undisturbed. Third, that the differential allotted to the Ohio & Mississippi upon first-class business by its through car lines be reduced to \$1, but it may retain by its other connections a differential of \$2. Fourth, the rates upon second-class business by all lines to remain unchanged."

Railroad Earnings.
Earnings of railroad lines for various periods are reported as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Ala. & Gt. South.	\$829,722	\$757,577	L. 572,145	9.4
Bur. C. R. & No.	2,019,656	2,164,096	D. 144,440	6.7
California South.	403,649			
Cin. N. O. & T. P.	2,034,273	1,900,998	L. 124,225	6.5
Cleve. & Canton.	26,447	215,197	L. 47,250	21.9
Net earnings.	72,653	40,136	L. 32,517	81.2
Den. & R. G. W.	736,707	715,496	L. 21,211	2.9
Lou. Ev. & St. L.	628,693	516,452	L. 112,241	21.7
Lou. N. A. & C.	1,346,350	1,204,966	L. 141,384	11.7
Net earnings.	419,395	221,742	L. 197,653	89.2
Mich. & N. W.	316,843			
Mobile & Ohio	1,297,488	1,486,333	D. 190,845	12.8
Nash. C. & St. L.	1,743,856	1,567,866	L. 175,990	11.2
Net earnings.	606,416	635,097	L. 61,329	9.7
N. Orl. & N. E.	422,145	461,506	D. 39,361	8.5
Tol. & Ohio Cent.	567,12			
Vicks. & Mer.	343,477	290,228	L. 44,229	14.8
Vick., Shre. & P.	311,970	259,077	L. 52,873	20.4

Eight months to Aug. 31:

	1886.	1885.	Inc. or Dec.	P. c.
Georgia Pacific	\$475,982	\$390,969	L. \$85,013	21.7
Main. Central.	1,045,832	1,831,127	L. 114,705	6.3
Net earnings.	768,802	698,083	L. 68,717	9.8
So. Pacific Co.				
Atlantic System	5,390,658	5,441,890	D. 51,241	0.9
Net earnings.	1,234,472	2,78,680	D. 84,197	40.6
Pacific System	14,802,516	13,788,777	L. 1,103,739	8.0
Net earnings.	7,413,357	7,237,145	L. 176,212	2.4

Month of July:

	1886.	1885.	Inc. or Dec.	P. c.
California South.	\$59,511			
Deficit.	2,210			
Rome, Wat. & Og.	248,065	\$216,082	L. \$31,983	14.8
Net earnings.	105,126	81,369	L. 23,817	29.4

Month of August:

	1886.	1885.	Inc. or Dec.	P. c.
Cairo, V. & C.	\$60,777	\$42,025	L. \$18,752	44.7
Net earnings.	14,598	7,054	L. 7,542	106.9
Georgia Pacific.	69,809	51,013	L. 18,796	36.8
Maine Central.	307,352	279,082	L. 28,270	10.1
Net earnings.	163,147	142,256	L. 21,291	15.0
Rome, W. & Og.	307,972	244,418	L. 63,554	26.0
Net earnings.	169,049	115,099	L. 54,909	47.2

Month of September:

	1886.	1885.	Inc. or Dec.	P. c.
Ala. Gt. South.	\$104,428	\$90,523	L. \$13,905	15.4
Bur. C. R. & No.	207,854	200,973	D. 2,119	0.7
California South.	73,504			
Cin. & Eastern.	19,848	14,704	L. 5,144	35.0
Cin. J. & Mack.	21,342	15,504	L. 5,838	37.7
Clin. N. O. & T. P.	251,312	241,225	L. 10,087	4.2
Cleve. & Canton.	33,807	24,892	L. 8,955	35.7
Den. & R. G. W.	9,833	6,407	L. 3,356	51.6
Fla. Ry. & N. Co.	69,040	99,045	L. 19,045	19.2
Lou. Ev. & St. L.	88,217	65,547	L. 22,670	34.4
Mobile & Ohio.	154,944	190,038	D. 35,094	18.5
Nash., C. & St. L.	223,311	102,865	L. 30,446	15.8
Net earnings.	86,839	79,646	L. 7,193	9.0
N. Orl. & N. E.	45,045	45,874	L. 71	0.2
Valley, of Ohio.	53,967	46,944	L. 7,023	14.9
Vicks. & Mer.	36,401	36,883	D. 482	1.3
Vick., S. & P.	44,3			

tained him in its service after it had received notice that he was negligent in the discharge of his duties. The servant should also aver that he had no knowledge of the negligent habits of his fellow-servant. An allegation that he "was wholly unacquainted with," etc., does not meet this objection.

3. The complaint shows that the plaintiff was employed on the construction train six weeks, during which time the fellow-servant, through whose negligence it is claimed the injuries occurred, was the engineer, and no excuse is alleged for remaining in the service of the company after he knew or ought to have known of the engineer's negligence. The complaint is bad for failing to allege an excuse.

OLD AND NEW ROADS.

Alabama & Tennessee.—This company has filed articles of incorporation in Alabama to build a railroad from Florence, on the Tennessee River, northward to the Tennessee state line, to connect with a road to be built in Tennessee.

Allegheny Valley.—The Court has received a petition from the Receiver of this road for leave to purchase a shifting engine and 150 new freight cars, and to sell 100 oil tank cars. The Court directed notice to be given, in order that parties in interest may present objections, if they have any, on Nov. 3.

Ashland & Pittsburgh.—It is said that the Pennsylvania Co., which owns this road, will shortly begin an extension of some 15 miles, from the present terminus at Youngstown, O., to Wampum, Pa., the terminus of the New Brighton & New Castle road. The object of this extension is to provide a shorter line, with easier grades, than the one now in use, for the large traffic carried over this road, which consists chiefly of iron ore, carried from Lake Erie to the furnaces in Pittsburgh and in the Shenango Valley, and in coal carried to the lake.

Atchison, Topeka & Santa Fe.—On the extension of the Southern Kansas line through the Indian Territory some 60 miles are now graded. The work is progressing rapidly. The track is laid from the starting point at Arkansas City, Kan., southward for 25 miles. A very large force is employed on this work.

Atlanta & Hawkinsville.—At a meeting of the directors in Atlanta, Ga., last week, it was announced that stock subscriptions had been secured to an amount sufficient to grade the road. The board resolved to wait a short time longer, until more subscriptions had been made, before beginning work. If the expected amount is secured the directors promise to have the road completed within a year from the present time.

Atlantic & Pacific.—It is said that the arrangement under which the Atchison, Topeka & Santa Fe and the St. Louis & San Francisco companies are to guarantee interest on the Atlantic & Pacific firsts at 4 per cent. is nearly completed. It is understood that the guarantee will not be a joint one, but that each of the companies will guarantee interest on half the bonds.

Bath & Hammondsport.—This road has been sold by Captain Allen Wood, of Hammondsport, N. Y., who has owned it for some time, to Mr. Henry Stebbins, of Canandaigua, N. Y., for \$85,000. The road is of 3-ft. gauge and extends from Hammondsport, N. Y., on Lake Keuka, to Bath, on the Erie road, a distance of 9 miles. It has a considerable local business and in the summer time does a large passenger excursion business.

Beech Creek.—As noted more fully elsewhere, the Pennsylvania Supreme Court has confirmed the decision of the Common Pleas enjoining the Pennsylvania Railroad Co. and the Northern Central Co. from completing the purchase of a controlling interest in the stock of this company. The ground of the decision is the clause in the state constitution forbidding the consolidation of parallel and competing roads.

Boston & Lowell.—The directors of this company have agreed on the terms of the lease of the Massachusetts Central road, and it will shortly be submitted to the stockholders for ratification at a special meeting.

Burlington, Cedar Rapids & Northern.—The Sioux Falls extension is now completed to the Dakota line, 32 miles west from the starting point, at Ellsworth, Ia. About 8 miles of track remain to be laid to complete the branch to Sioux Falls, Dak., and nearly all the grading is finished.

California Southern.—The statement for July and the seven months to July 31 is as follows:

	July.	months
Earnings	\$59,510	\$964,946
Expenses	61,720	397,771
Deficit	\$2,210	\$32,825

The expenses still continue greater than the earnings of the road.

Canadian Pacific.—It is reported that this company has agreed to buy the Stanstead, Shefford & Champlain road, now owned by the Central Vermont. The intention probably is to make the road a part of the Extension to the maritime provinces, which is known as the International line. The road might be used for that purpose; by itself it is not worth much.

Central, of Georgia.—Atlanta dispatches state that large purchases of the stock of this company continue to be made by parties represented by General E. P. Alexander, and it is reported that the object of these purchases is to secure a controlling interest in the stock for the Louisville & Nashville Co. The annual election takes place in January next. The purchases so far have been mainly of small holdings, and it is not known that any of the large blocks have changed hands. The stock of the company is very widely distributed and a considerable portion of it is held in small lots, making it somewhat difficult for outsiders to trace the purchases.

Central Iowa.—The recent election of Mr. A. B. Stickney, President of the Minnesota & Northwestern Co., to be president of this company also, gives color to the report that a controlling interest in this road has been sold to the parties who are building the Minnesota & Northwestern road.

Central Massachusetts.—A Boston dispatch says that the terms of the lease of this road to the Boston & Lowell Co. have been finally agreed upon and will be submitted to the stockholders at a meeting to be held Oct. 30. The terms agreed upon are substantially as noted heretofore, a rental, to be based on the amount of the gross earnings, and a new issue of bonds, to be made for the purpose of paying off present debts and extending the road to Northampton.

Central, of New Jersey.—In Philadelphia, Oct. 15, the United States Circuit Court granted an order instituting a new receivership for this road and appointed as receivers Mr. John S. Kennedy, who is a director and Vice-President of the company, and Mr. Joseph S. Harris, who is President of the Lehigh Coal & Navigation Co. The appointment was

made on the application of counsel representing the company and the trustees of the adjustment mortgage bonds. Mr. Henry S. Little is still Receiver, but his present authority applies only to the settlement of debts and claims contracted under the former receivership and has nothing to do with the new appointment. This movement was somewhat unexpected, and, it is said, that the application was made and the appointment procured in order to facilitate the reorganization of the company. It does not necessarily supersede the lease of the road to the Philadelphia & Reading, and it is understood that that company will continue to operate the railroad for the present; but the new receivers have taken charge of all the assets of the company, and all payments under the lease will be made to them. What action will be taken as to the termination of the lease, under the orders already granted, is not yet certain.

Central Vermont.—It is reported that this company has succeeded in selling its Stanstead, Shefford & Champlain line to the Canadian Pacific. This branch runs from St. Johns, P. Q., to Waterloo, 48 miles, and has a small local traffic. The Canadian Pacific will probably use it as part of its International line.

Charlotte, Columbia & Augusta.—As noted elsewhere, certain stockholders of this company have begun suit to set aside the lease of the road to the Richmond & Danville Co. The lease was made by the Richmond & West Point Terminal Co., holding a majority of the stock, and, if so claimed, without the consent of the other stockholders.

Chicago, Burlington & Northern.—A report comes from Boston to the effect that this company is to be consolidated with the St. Paul, Minneapolis & Manitoba, and it is said that negotiations have been in progress so far that it has been agreed that the consolidation shall be on the basis of 150 for Manitoba stock and 90 for Chicago, Burlington & Northern. The relations of the Chicago, Burlington & Quincy Co. and the Manitoba Co. have been friendly for some time past, and it has been understood that a considerable amount of Manitoba stock is now held in Boston, and by parties who are largely interested in the Chicago, Burlington & Quincy. Nothing, however, has heretofore been said about the reported consolidation. When the Chicago, Burlington & Northern road was organized the Chicago, Burlington & Quincy took one-third of the stock, and, it is supposed, still holds that amount.

Chicago, Burlington & Quincy.—The Galesburg & Rio Branch of this road, which has been under construction for some time, is completed and will shortly be opened for business. It extends from Galesburg, Ill., northward to Rio, 12½ miles. It is intended to make a shorter connection with the Chicago, Burlington & Northern road for business coming from the southward.

The Holdrege Branch of this company's Burlington & Missouri River line is now completed and opened for business to Curtis, Neb., 23 miles beyond the late terminus at Farnam and 73 miles from Holdrege.

Tracklaying is completed on the Omaha & North Plate Branch of this company's Burlington & Missouri River line, which runs from Omaha, Neb., southwest, to Ashland. It is 26 miles in length and is a loop line, or cut-off, 18 miles shorter than the old main line between these points.

Chicago, Milwaukee & St. Paul.—On the Kansas City Extension of this road the work is making very good progress. A large amount of the grading has been completed. Tracklaying was recently begun and the rails have already been laid for 10 miles southward from Ottumwa, Ia. It is expected that the line will reach Chillicothe, Mo., this winter and that it will be completed to Kansas next season.

On the branch from Ellendale, Dak., northward to Jamestown grading has been completed from Ellendale to Marengo, 20 miles, and track has been laid for 10 miles.

Cincinnati, Hamilton & Dayton.—The statement for the half year from April 1 to Sept. 30 is as follows:

Gross earnings	\$1,509,875
Expenses	894,482
Net earnings	\$615,393
Taxes	\$45,013
Interest and pref. stock dividends	326,003
	371,016

Surplus for the half year \$244,777

On this showing the board declared a quarterly dividend of 2 per cent. The board also decided to improve the time made on several of the passenger trains. The President was authorized to contract for 1,000 new freight cars.

It is reported that this company is negotiating for the purchase or lease of the Cincinnati, Wabash & Michigan road.

Cincinnati, Indianapolis, St. Louis & Chicago.—This company has begun running a through passenger train between Cincinnati and St. Louis, in connection with the Vandalia Line. Other arrangements made for through business have given rise to the report that Baltimore & Ohio business between Cincinnati and St. Louis was to be transferred to this company. Officers of the company, however, state that there is no foundation for such a report, although they hope to secure a share of that business. The new train has been put on simply because there is a considerable amount of business between Cincinnati and St. Louis and the present was said to be a favorable time for securing it.

Cincinnati, Jackson & Mackinaw.—The track on this road is now completed to West Alexandria, O., 7 miles southward from the late terminus at Lewisburg and 111 miles from the northern terminus at Cecil. The first train to the new terminus of the road ran through Oct. 18, and the event was celebrated by an excursion and barbecue.

Cincinnati, Sandusky & Cleveland.—It is said that negotiations for a settlement between this company and the Indiana, Bloomington & Western, which leases the road, have nearly reached a conclusion, and that a preliminary agreement has been made between the presidents of the two companies, which will shortly be submitted to the stockholders. It is said that this agreement provides for a consolidation of the two companies and the funding of all debts of both companies in a 5 per cent. general consolidated bond, as fast as present issues can be retired. The stock of both companies is to go into the consolidation on an even basis, and the Sandusky preferred stock to be exchanged for new preferred stock. Columbus, Springfield & Cincinnati stock to be taken up by an issue of second preferred stock. It is also said that the agreement provides for the settlement of overdue rental in consolidated bonds.

Cincinnati, Wabash & Michigan.—Reports are current that this company is negotiating for the sale or lease of the road to the Cincinnati, Hamilton & Dayton Co. The road runs from Anderson, Ind., northward to Benton Harbor, Mich., a distance of 155 miles, and the company has a contract which gives it the use of the Cleveland, Columbus, Cincinnati & Indianapolis tracks for 35 miles, from Anderson to Indianapolis. The connection with the Cincinnati, Hamilton & Dayton would be made at Indianapolis.

Cleveland, Akron & Columbus.—Work has been begun on the branch of this road to Dresden, O., which was

projected and partly graded some 10 years ago. Contracts for the work have been let and the rails purchased, and the work is to be pushed as fast as possible. The length of this line, from Killbuck to Dresden, is 34 miles.

Denver, Memphis & Atlantic.—The following is a statement of the track laid on this road during the month of September: Cheyenne Division, from the Verdigris River to a point 4 miles west of Coffeyville, Kan., 6.7 miles; Conway Springs Division, eastward to a point two miles east of Belle Plaine, 8.8 miles, also westward to Kingman, 6.5 miles, making a total of 21½ miles track laid during the month.

Detroit, Mackinac & Marquette.—The plan for the reorganization of this road, which is shortly to be sold under foreclosure, provides for the issue of \$5,000,000 common stock, \$8,000,000 preferred stock and \$1,600,000 first mortgage 5 per cent. bonds. The old first-mortgage bonds will receive \$500 in new bonds and \$700 in preferred stock for each \$1,000 bond, the income bonds, \$500 in preferred stock and \$1,000 in common stock for each \$1,000 bond, and the old stock 50 per cent. of its par value in new common stock. There will remain under this plan in the treasury of the company \$1,125,000 in common stock, \$654,000 preferred stock and \$460,000 first mortgage bonds, which will be used to provide for the construction of the branch to the Sault Ste. Marie, which will be 48 miles long. It is stated that nearly all the holders have assented to this plan.

It is reported that as soon as the reorganization of this company can be completed, work will be begun on the extension to Sault Ste. Marie.

Duluth, South Shore & Atlantic.—This company has been organized to build a railroad from Duluth, Minn., along the south shore of Lake Superior to Marquette, Mich., or to a connection with the Detroit, Mackinac & Marquette road.

Duluth, Superior & Michigan.—This company was lately organized to build a railroad from Duluth, Minn., through Wisconsin to the Montreal River on the Michigan line.

Fremont, Elkhorn & Missouri Valley.—Track on the Lincoln Branch of this road is now laid to Lincoln, Mo., 23 miles southward from the late terminus at Swedesburg and 52 miles from the junction with the main line at Fremont. Regular trains were to begin to run to Lincoln this week.

Helena & Red Mountain.—The track is reported laid on this road for 8 miles from Helena, Mont., and work is progressing rapidly toward Red Mountain.

Indiana, Bloomington & Western.—It is reported that a plan of reorganization has been adopted which provides for a reduction of interest on the bonds of this road, and also for a consolidation with the Cincinnati, Sandusky & Cleveland road. Negotiations with the last named company have been in progress for some time.

Kansas City, Memphis & Birmingham.—The recent letting of contracts on the grading of the Western Division of this road, between Tupelo, Miss., and Birmingham, Ala., resulted in the acceptance of bids as follows: Nolan & Colby, of Birmingham, Ala., 4 sections on the Mississippi Division; Ryan & Marsteller, of Kansas City, Mo., 9 sections on the Mississippi Division; Garney & Lee, of Memphis, Tenn., 8 sections on the Mississippi Division; McDowell & Shea, of Vicksburg, Miss., 4 sections on the Mississippi Division; J. H. Sullivan, of Memphis, Tenn., the remaining 3 sections of the Mississippi Division and 4 sections on the Alabama Division; Gibson & Co., of West Point, Miss., 10 sections on the Alabama Division; Price & King, of Birmingham, Ala., 12 sections on the Alabama Division.

The entire road is now under contract, with the exception of 14 miles, which will not be let for several months.

Louisville, New Albany & Chicago.—At the quarterly meeting of the board held last week, the following statement was presented for the nine months to Sept. 30:

	August	1885.	Inc. or Dec.	P. c.
Earnings	\$1,346,350	\$1,204,966	I. \$141,384	11.7
Expenses	926,935	983,234	D. 56,260	5.7

Net earnings \$419,395 \$221,742 I. \$197,633 89.2

The earnings this year were \$2,823 gross and \$879 net per mile of road, and are the largest ever reported for this road.

Maine Central.—The statement for August and the eight months to Aug. 31 is as follows:

	August	1885.	Eight months
Earnings	\$307,152	\$279,082	\$1,945,832 \$1,831,127
Expenses	143,805	130,829	1,170,030 1,153,042

Net earnings \$163,547 \$142,256 \$766,802 \$698,085

For the eight months the gross earnings increased \$114,705, or 6.3 per cent., and the expenses \$45,988, or 4.1 per cent., leaving a gain of \$68,717, or 9.8 per cent., in net earnings.

Marietta & North Georgia.—This company has notified the Governor of Georgia that the road is completed to the North Carolina line, and has requested him to inspect the work, to see that it has been done according to law. The end of the track at the state line is 111 miles from Marietta, Ga., and 9 miles of track remain to be laid to complete the road to the terminus at Murphy, N. C. The grading is all finished.

Mexican National.—Mr. Smithers, representing Matheson & Co., of London, holders of \$5,000,000 of bonds, and Gen. Palmer, representing the interests of American holders, have come to an agreement in Mexico under which it is understood the American and London committees will agree upon a joint plan which it is expected will be satisfactory to all parties. The plan will provide for a small prior lien issued at the rate of about \$9,000 a mile, and an amicable foreclosure under which the present firsts will take rank as a second mortgage. The new firsts will be redeemable at short notice, when the seconds will resume their old standing as a first lien. The objectionable contracts have all been canceled and the new company will be left free to make others in their place.

Mexican Railroad Notes.—The following notes are from the Mexican Financier of Oct. 9:

The uncompleted section of the Merida & Calkin Railroad, state of Yucatan, is being kept in good repair. But it seems unlikely that the road will be finished for a long time to come.

The Mexican (Vera Cruz) Railway Co. has contracted for 40,000 steel ties in England at the rate of 4 shillings 4 pence each. It is thought they can be landed here and laid at less than \$2 each, Mexican money.

The Central Railroad has passed through the rainy season with remarkably few delays from washouts. This result is due largely to the precautionary measures taken since last year's floods.

The improved rolling stock which has been placed on the Morelos Railroad makes this picturesque route more than ever attractive to tourists. The cars are of American make

and are equal to the best cars on any narrow-gauge railway in the world. One feature which will elicit deserved commendation is the large windows which permit ease of observation of the remarkable scenery along this route. In fact, the cars are veritable observation cars. For a short trip, that to Amecameca, at the foot of the volcanoes, is to be recommended, but travelers will find in a journey to Cuautla and Yautepec, in the warm country below, a hundred points of interest.

Minnesota & Northwestern.—As noted elsewhere, it is understood that arrangements have been made for closer relations between this road and the Central Iowa.

Tracklaying on the Dubuque & Northwestern road, which forms this company's extension to Dubuque, Ia., was completed last week. The new line leaves the original line of the Minnesota & Northwestern at Hayfield, Ia., and runs southeast to Dubuque, a distance of 172 miles, making a line 253 miles in length from St. Paul to Dubuque. As soon as the finishing work is completed the tracklaying force will be removed to the company's line from Freeport, Ill., to Chicago, which is 109 miles in length, and on which a considerable amount of grading is already completed.

Missouri Pacific.—The St. Louis & Emporia Branch, which was last year completed from Butler, Mo., west to Kincaid, Kan., is now completed to Colony, Kan., 12 miles west of Kincaid and 68 miles from Butler. This is one of the new lines which the company is extending into Central Kansas.

Mobile & West Alabama.—This company is pushing the work of rebuilding the old Alabama Grand Trunk road, between Mobile and Jackson, and has also a considerable force at work grading and clearing the road-bed on the new line north of Jackson.

Nashville, Chattanooga & St. Louis.—The statement for September and the three months of the fiscal year from July 1 to Sept. 30 is as follows:

	September.	Three months.	
Earnings	\$223,311	\$192,665	\$663,054
Expenses	136,472	113,219	383,832
Net earnings	\$86,839	\$79,346	\$222,988
Interest and taxes			175,106
Improvements			17,075
Total charges			192,181
Surplus			\$184,122
			\$87,041
			\$38,866

The statement for the three months shows an increase of \$122,406, or 22.7 per cent., in gross earnings; an increase of \$56,234, or 25.2 per cent. in net earnings; and an increase of \$48,175, or 128.9 per cent., in the surplus over charges.

New Brunswick.—This company has had all this season several trains and a large force of men employed in ballasting its line between St. John, N. B., and McAdam Junction. The force employed has ballasted with gravel 82 miles of the road, leaving only 10 miles to be completed.

New York, Chicago & St. Louis.—In Cleveland last week all the briefs in the foreclosure suit were filed by the counsel for the different parties in the case. The dispatches say that the briefs contain nothing of special interest beyond what was brought out at the hearing in the suit.

Northern Pacific.—The James River Valley Branch of this road is now completed to Oakesdale, Dak., 30 miles southward of the old terminus at Lamoure and 108 miles from the junction with the main line at Fargo. At Oakesdale this line connects with the recent extension of the Chicago & Northwestern James River Valley branch.

Ohio & Mississippi.—At the annual meeting in Cincinnati last week the expected change in the board was made and the road is now under control of the outside stockholders, the Baltimore & Ohio Co. retaining only a single representative. Reports have been current that the road would lose the Baltimore & Ohio business, but this is not at all probable, and it is understood that arrangements have been made under which friendly relations will be continued, and this road will carry a large portion, if not all, of the Baltimore & Ohio's St. Louis business.

Ohio River.—Tracklaying on this road is progressing steadily, and at latest accounts the track was laid to a point 35 miles north of the starting-point at Point Pleasant, W. Va., an increase of 11 miles. Tracklaying is also in progress from Parkersburg southward, but has been delayed somewhat on that end of the road by bridge work.

Pennsylvania.—This company's engineers are now making the final location for the extension of the Pottsville & Mahanoy branch of the Schuylkill Valley Division, from Frackville, along the north side of Broad Mountain to Mahanoy City, and thence through St. Nicholas into Shenandoah. A preliminary survey was made of this branch about a year ago and the locating party is going over substantially the same ground.

In Pittsburgh, Oct. 18, the Pennsylvania Supreme Court rendered a decision in the South Pennsylvania Railroad case. It was a *per curiam* affirming the decrees of the Dauphin County Court, and putting the costs on the Pennsylvania Railroad Co., the appellants.

Five distinct appeals were involved, and embraced those of the Pennsylvania and the Northern Central companies concerning the lease of the Beech Creek; and the Pennsylvania, the Bedford & Bridgeport, and the Pennsylvania Co., as to the lease of the South Pennsylvania. In all these cases the decision of the lower Court was sustained.

The decision of the Supreme Court sustains that of Judge Simonton, of the Dauphin County Court, in granting, at the instance of Attorney-General Cassidy, a preliminary injunction restraining the transfer of a majority of the stock of the Beech Creek Co. to the Northern Central Railway Co.

The decision also forbids the transfer of the majority of the stock of the South Pennsylvania Co. to the Bedford & Bridgeport Railroad Co., a small branch line controlled by the Pennsylvania Railroad Co. This leaves the South Pennsylvania in the hands of the originators of the scheme, and although the control is nominally with the Vanderbilts, it is generally supposed to be really with the minority, which favors the completion of the road.

The proceedings against the projected purchase of the South Pennsylvania and the Beech Creek roads by the Pennsylvania Railroad Co. were instituted in the Dauphin County Court last fall by Attorney-General Cassidy, of Pennsylvania, on suggestion of a minority of the syndicate, who applied for and obtained an injunction from the Dauphin County Court forbidding a transfer of the stock to the Pennsylvania Railroad Co., claiming that the purchase was unconstitutional and intended to destroy a competing corporation.

The decision of the lower Court, however, was not rendered until Jan. 15 of the present year. It was adverse to the Pennsylvania Railroad Co. The decision, in the first instance, maintained that the South Pennsylvania Railroad is a competing railroad because of its contracts with other roads at its western terminus, whereby all traffic would be transported from Port Perry to Pittsburgh, making it a competing line with the Pennsylvania Railroad. Before comple-

tion it is a parallel, but after completion it is a competing road. The entire opinion, almost, was a recital of the facts as brought out at the trial and argument.

In the matter of the Beech Creek, Clearfield & Southwestern Railroad Co., the Pennsylvania Railroad Co. and the Northern Central Co., the Dauphin County Court held that the evidence did not require its continuance against the other defendants. The Court believed that the Pennsylvania and the Northern Central were not in a position to urge that if the bargain were fully carried out it would not violate the constitutional provision.

The Pennsylvania Railroad Co. at once appealed the cases to the Supreme Court, with the result announced above.

It is said that counsel for the Pennsylvania Railroad Co. will present affidavits to the Court and ask for a rehearing, on the ground that material evidence in the case is still to be brought forward.

Peoria, Decatur & Evansville.—The stockholders will vote next month on a proposition to issue new general mortgage 5s. to be exchanged for the outstanding income bonds.

It is said that the question of a consolidation with the Evansville & Terre Haute Co., which controls this road, is now under consideration.

Port Royal & Western Carolina.—Arrangements have been completed for the consolidation under this name of the several lines in South Carolina controlled by the Central Railroad Co. of Georgia. These lines include the Port Royal & Augusta, the Augusta & Knoxville, the Greenwood, Laurens & Spartanburg, the Greenville & Laurens and the Savannah Valley road, including the lines from Augusta, Ga., to Port Royal, from Augusta to Laurens and Greenville, and from Augusta westward to Anderson, making 334 miles of road in all.

Providence Terminal Facilities.—Some five years ago the railroads entering the city of Providence, R. I., asked for increased terminal facilities, especially for passenger traffic, their business having far outgrown the very limited quarters now in use. The City Council appointed a commission, which, after working for more than a year, presented a carefully prepared plan for accommodating all the railroads. The City Council discussed the plan, but failed to take any action, and nothing more was done, the commission being unable to act further. At a meeting of the City Council held Oct. 19, however, the matter was at last brought up again, and a resolution was passed instructing the commission to report forthwith the present condition of affairs and what remains to be done to carry the plan into effect.

Puget Sound & Gray's Harbor.—The track on this road is now laid for 6½ miles from Little Skookum, Wash., southwest, and the road is carrying a considerable amount of lumber to the mills at Blakeley and Little Skookum. The road is to be pushed southward into Chehalis County, with the intention of completing it hereafter to Gray's Harbor, on the Pacific coast.

Richmond & Danville.—In the Superior Court at Augusta, Ga., Oct. 19, suit was begun by J. H. Lowrey and others, stockholders of the Charlotte, Columbia & Augusta Co., to set aside the lease of that road to the Danville Co. The complaint charges that the lease is against the interest of the stockholders, and was completed without their legal consent. The Court appointed a hearing in the case for Nov. 15 next.

Richmond & West Point Terminal Co.—At a meeting of the board in New York, Oct. 20, it was decided to call a special meeting of the stockholders for Nov. 20, to consider important matters. A circular will be issued to stockholders, explaining the situation.

Rome, Watertown & Ogdensburg.—This company's statement for the month of August is as follows:

	1886	1885	Inc. or Dec.	P. C.
Earnings	\$307,972	\$244,418	I. \$83,554	26.0
Expenses	138,564	129,319	L. 9,245	7.2
Net earnings	\$169,408	\$115,059	L. \$54,300	47.2
Other receipts	503	880	D. 377	42.8
Net income	\$169,911	\$115,979	L. \$53,932	46.5

The earnings include those of the leased Utica & Black River road.

St. Louis, Arkansas & Texas.—The gauge of the Missouri & Arkansas Division of this road, extending from Bird's Point, Mo., to Texarkana, Tex., 418 miles, was changed from 3 ft. to standard gauge Oct. 18. Preparations for the change have been in progress for some time, and it was quickly and successfully made. The company has now on hand 70 new standard gauge locomotives and about 1,200 cars, and has also on hand some 1,100 freight cars, which require only new trucks to fit them for the standard gauge. The Texas Division of 305 miles will be changed about Nov. 1. The preparations are now actively in progress.

St. Louis, Fort Scott & Wichita.—On behalf of a number of bondholders a suit has been begun to compel the officers of the Missouri Pacific Co., which now owns a controlling interest in the stock of this road, to make an accounting of the earnings and expenses of the road. It is claimed that since the transfer was made the earnings of the road have largely increased, and that it is now a profitable property, and the bondholders desire to secure payment of their overdue interest. The Court has appointed a commissioner to take testimony in the case.

St. Paul & Duluth.—This company offers \$500,000 in first mortgage bonds, to be issued by the Duluth Short Line Co., and guaranteed by the St. Paul & Duluth Co. The Duluth Short Line is to extend from Thomson Junction to Duluth, a distance of about 25 miles, with a branch to West Superior. The new line will give the company an independent road into Duluth, and enable it to give up the use of the tracks from Thomson Junction, which it now shares with the Northern Pacific and which does not furnish facilities for the traffic of both companies.

St. Paul, Minneapolis & Manitoba.—It is announced that this company has negotiated the sale of \$6,000,000 in new 4½ per cent. consolidated firsts, with a syndicate consisting of Kuhn, Loeb & Co., Brown Brothers & Co. and J. Kennedy Todd & Co. These bonds are issued on new mileage constructed, and the proceeds will be used in payment for some 600 miles of branch lines, including the Montana Extension. About 300 miles of this new road will be completed by the close of the present year.

Shenango & Allegheny.—In the United States Circuit Court in Pittsburgh, Oct. 14, a final decree of foreclosure and sale was granted against this road, and a Master was appointed to make the sale, after the necessary advertising. The sale will take place some time in January next. The Court fixed the minimum price at \$650,000, of which \$50,000 must be paid in cash.

Shenango Valley.—The directors of this projected line have been negotiating with the Lake Shore & Michigan Southern Co. for the construction of the road, and it is understood that that company has agreed to build it. The road

is to be a short line connecting the Jamestown & Franklin Branch of the Lake Shore with the furnaces and coal mines about Sharon, Pa. It is expected to do a large business, if built.

Southern Pacific Co.—This company's statement for August, giving the earnings of the Atlantic System only in detail, is as follows:

	Gross earnings	Net earnings
Gal. Har. & San Ant.	\$231,856	\$165,600
Gulf, W. T. & P.	3,579	10,655
Louisiana Western.	54,723	47,439
Morgan's La. & T. & P.	303,504	323,966
N. Y., Tex. & Mex.	14,479	29,000
Tex. & N. Orleans.	70,644	98,490
	1886. 1885.	1886. 1885.
Total, Atlantic Sys.	\$964,785	\$766,210
Pacific System.	2,120,826	1,900,362
	1,067,729	1,080,028
Total, all lines.	\$2,507,611	\$2,000,572
	\$1,251,028	\$1,411,761

* Deficit.

Rental received for August of this year was \$46,681, making a total of \$1,298,309. The total charges amounted to \$1,162,836 and new construction to \$31,806, a total of \$1,194,642, leaving a surplus of \$103,667 for the month. The statement for the eight months to Aug. 31, this year, is as follows:

	At. System.	Pac. System.	Total
Earnings	\$5,300,658	\$14,862,516	\$20,283,174
Expenses	4,156,186	7,475,159	11,635,345
Net earnings.	\$1,234,472	\$7,413,357	\$8,647,829
Add rentals received.			373,443
Total.			29,021,272
Interest, rentals, taxes, etc.			\$9,302,088
Construction and improvements.			238,413
			9,541,101

Deficit, eight months \$519,829
The total earnings for the eight months, as compared with last year, increased \$1,052,498, or 5.5 per cent.; the expenses increased \$1,720,483, or 17.4 per cent., the result being a decrease of \$667,985, or 7.2 per cent., in net earnings.

Southern Pennsylvania.—As noted more fully elsewhere, the decision of the Court of Common Pleas enjoining the Bedford & Bridgeport Co. and the Pennsylvania Railroad Co. from acquiring the controlling interest in this road, has been confirmed by the Pennsylvania Supreme Court. The basis of the decision is the constitutional provision forbidding consolidation of parallel and competing lines.

A meeting of the subscribers to the syndicate for building this road will be held shortly to consider the effect of the decision and, it is said, to consider also a plan for resuming work on the road.

Strikes.—The strike of the brakemen on the New York, Pennsylvania & Ohio road ended finally last week, the men on the Mahoning Division following the example of those on the main line in accepting the compromise offered by the company.

The switchmen in the employ of all the railroads at Minneapolis struck Oct. 13, the companies having refused to grant an increase of about 10 per cent. in wages. All freight traffic was stopped for the time, the strikers killing the yard engines and resisting all attempts to put new men at work. On Oct. 16 the switchmen in the yards at St. Paul joined the Minneapolis strikers, but in a more quiet way, making no active demonstrations and confining their efforts to persuading the new men brought in to leave work. The companies, however, succeeded in moving some freight. On Oct. 18 application was made to the authorities for police protection, and several freight trains were moved, and active preparations made for a general resumption of work.

On Oct. 19, the Mayor of Minneapolis issued a proclamation calling on all parties to keep the peace, and requesting them to submit their differences to arbitration. In reply to this, General Manager Miller, of the Chicago, Milwaukee & St. Paul, wrote a letter saying that his company would not agree to an arbitration in this case. The companies are, apparently, inclined to insist upon their right to police protection, and also to fill up the strikers' places with new men.

Toledo, Ann Arbor & North Michigan.—The project for building the branch or extension of this road from some point on the Northern Division in Gratiot County, Mich., to Muskegon, has assumed definite form. The right of way and a considerable amount in local subscriptions have been secured for the line from the junction to Greenville, some 44 miles, and agents are now at work on the remaining 46 miles beyond Greenville. Should a sufficient amount be secured on the whole line the company agrees to complete it within a year.

Toledo, Peoria & Western.—The Bondholders' Committee gives notice that the time in which the first mortgage bondholders can deposit their bonds and sign the agreement is extended to Oct. 27 next. All bondholders who desire to join in the reorganization of the company should deposit their bonds with the Farmers' Loan & Trust Co., in New York, before that time.

Vermont Railroad Commission.—Two bills have been introduced in the Vermont Legislature at its present session, providing for the appointment of a railroad commission, with powers similar to that of Massachusetts. Both bills have been referred to a committee, and will probably be united. Vermont has had a railroad commissioner for a number of years, but his powers have been merely nominal and his duties very light. There is said to be a strong feeling in the Legislature that a commission is much needed, and, certainly, the railroads of Vermont need regulation quite as much as those of other New England states. The bills will be strongly opposed and their passage is somewhat doubtful.

Wabash, St. Louis & Pacific.—The deed of this company's property was acknowledged in the Federal Court, in St. Louis, Oct. 15, by the Master. The deed of delivery is made to the Purchasing Committee, James F. Joy, Ossian D. Ashley, Thomas L. Hubbard and Edgar T. Willes. The Court, on the petition of the Committee, granted an order for the sale of some of the road's property at St. Joseph, Mo., for \$25,000. An intervening petition was filed in the case seeking to establish a claim of \$45,000 in respect of rental coupons of the St. Louis, Ottumwa & Cedar Rapids Railroad as a charge upon the Wabash funds in the hands of the Receiver and Commissioner.

West End & East Point.—This company has been organized in Atlanta, Ga., to build a suburban line from that city to East Point, a distance of six miles.

West Penn & Shenango Connecting.—In Pittsburgh, Oct. 19, the United States Circuit Court granted leave to the Fidelity Trust Co., of Philadelphia, trustee, to bring suit to foreclose the first mortgage upon this road. The Court directs that notice be given to the present Receiver of the road, to W. W. Reed and other parties in interest.

Wichita & Trinidad.—This company has filed articles

of incorporation to build a railroad from Wichita, Kan., west to the Colorado line, and thence to the coal mines about Trinidad.

York Harbor & Beach.—It is stated that over \$40,000 of the stock of this proposed road has been subscribed and arrangements made to float bonds to a sufficient amount to complete the road. It will be a narrow gauge, 10 miles in length, leaving the Eastern Railroad at Butler's Crossing, passing through Kittery, Me., crossing York River near the harbor and running to Long Beach, Union Bluff and Evanston.

ANNUAL REPORTS

The following is an index to the annual reports of railroad companies which have been reviewed in previous numbers of the current volume of the *Railroad Gazette*:

	Page.
Alabama Great Southern.	423
Ala., N. O., Tex. & Pac. Junc.	423
Allegheny Valley.	588
Alliance, Niles & Ash.	651
Americus, Preston & Lump.	552
Archibald, Marion & L.	392
Atchison, Top & Santa Fe.	544
Atlanta & West Point.	554
Atlanta & N. Carolina.	425
Atlantic & Pacific.	504
B. & O. Employes' Relief Ass'n.	345
Baltimore & Philadelphia.	15
Baltimore & Ohio.	22
Boston & Lowell.	15
Boston & Maine.	23
Boston & Providence.	15
Buffalo, N. Y. & Philadelphia.	16
Bur. Cedar Rapids & No.	622
Cairo, Vincennes & Chicago.	536
Carolina & Atlantic.	249
Canadian Govt. Railroads.	272
Canadian Pacific.	363
Carolina Central.	366
Central Pacific.	409
Charlotte, Col. & Augusta.	155
Cheapeake & Dela. Canal.	534
Chester & Ohio R.	249
Cheshire.	104
Chicago & Alton.	156
Chi., Burlington & Quincy.	302
Chi. & Eastern Illinois.	714
Chi. & Grand Trunk.	324
Chi. & N. W. & St. L.	294
Chi. & North Western.	414
Chi., St. P. Minn. & Omaha.	256
Chi., St. L. & Pittsburgh.	324
Chi. & Western Indiana.	486
Chi. & West Michigan.	505
Chi., Illinoian & St. L.	659
Chi., Hamilton & Dayton.	538
Chi., Ind., St. L. & Chi.	588
Chi., & Muskingum Valley.	354
Chi., N. Orleans & Tex. Pacific.	140
Chi., Rictmont & Ft. Wayne.	652
Chi., Springfield.	208
Chi., W. Va. & Baltimore.	518
Cleve., Akron & Col.	192
Cleve., Cleveland & Canton.	192
Cleve., Col. & Ind.	208
Cleve., Lorain & Wheeling.	538
Cleve., & Pittsburgh.	622
Cleve., Youngstown & Pitts.	622
Columbia & Greenville.	174
Col., Hocking Ry. & Toledo.	367
Concord.	367
Conn. & Passumpsic Rivers.	632
Connecticut River.	85
Consolidation Coal Co.	134
Cumberland Valley.	507
Dal. & Hudson Coal Co.	204
Del., N. J. & Western.	104
Denver & Rio Grande.	156
Denver & Rio Gr. Western.	191
Des Moines & Fort Dodge.	291
Detroit, Lansing & No.	323
Detroit, Gd. Haven & Mil.	324
Dublin & Franklin.	258
East St. L. & Cincinnati.	151
East Tennessee, Va. & Ga.	622
Erie & Pittsburgh.	651
Fitchburg.	68
Flint & Fere Marquette.	570
For Wayne, Cin. & Louis.	307
Fremont, Elkhorn & Mo. Vy.	535
Gaithersburg, Houston & Hen.	527
Georgia Pacific.	272
Georg. & Railroad.	714
Grand Rapids & Indiana.	653
Gulf, Colorado & Santa Fe.	454
Hanover June, Han. & Gett'y.	414
Hannibal & Western.	152
Huntington & Broad Top Mt.	120
Illinois Central.	174
Indianapolis & St. Louis.	306
International & Gt. No.	655
Iowa & Great Northern.	387
Jacksonville & Shreveport.	123
Jeff. Madison & Indianapolis.	652
Kans. City, Ft. Scott & Gulf.	416
Kans. City, Springfield & Mem.	480
Kansas City Union Depot Co.	256
Lake Shore & Mich. So. 33, 314	314
Lawrence, Kans.	651
Lehigh Coal & Navigation Co.	140
Lehigh Valley.	68, 234
Leh. & W. Ikes-Barre Coal Co.	139
Little Miami.	391
Little Rock & Ft. Smith.	508
Louisville & Nashville.	695, 714
Louisville, N. Albany & Chi.	255

St. Joseph & Grand Island.

This company, as reorganized, owns a line from St. Joseph, Mo., to Grand Island, Neb., 252 miles. The statement of the company to the New York Stock Exchange gives figures for the year ending Aug. 31 last.

The company has \$4,600,000 stock, \$7,000,000 first-mortgage 6s and \$1,680,000 second-mortgage income 5s. There is no floating debt.

The company has recently begun to build several branches and feeders in Kansas and Nebraska through the agency of controlled organizations.

The earnings and income for the year were as follows:

Gross earnings (\$4,649 per mile) \$1,171,501
Expenses (53.3 per cent) 624,468

Net earnings (\$2,171 per mile) \$547,035
Other income 11,760

Total \$558,795
Interest paid 432,000

Balance, surplus for the year \$96,795

This was the first full year of the company as reorganized. The interest charged includes full interest on the first-mortgage bonds and 2½ per cent. on the incomes.

Chesapeake, Ohio & Southwestern.

This company operates a line from Louisville, Ky., to Memphis, Tenn., 393.48 miles, with a branch from Cecilia Junction, Ky., to Elizabethtown, 6 miles; 398.48 miles in all, with 45.70 miles of sidings. The report is for the year ending Dec. 31. Since the close of the year the road has been leased to the Newport News & Mississippi Valley Co.

The company owns the road from Elizabethtown, Ky., to Memphis, Tenn., 351.58 miles, and has a perpetual lease of the road from Louisville to Cecilia Junction, 46.90 miles. During the year 42.49 miles of iron rails have been replaced with steel rails, leaving but 124.42 miles of iron rails in the main line, and it is contemplated to substitute steel rails for this remaining distance during 1886.

The equipment includes 64 locomotives; 19 passenger, 2 combination and 9 baggage, mail and express cars; 466 box, 88 stock, 196 coal, 479 gondola, 186 flat and 33 caboose cars; 1 officers' car and 35 boarding and tool cars.

The general account is as follows, condensed:

Common stock.	\$6,030,600
Preferred stock.	3,698,000
Funded debt.	11,203,000
Unpaid coupons.	245,830
Bills, accounts and balances payable.	917,049
Total	\$21,993,379

Road and equipment \$19,986,673

Cash, accounts receivable, etc. 390,681

Company's bonds unsold. 1,527,00

Income account, debit balance. 106,023

Total **\$21,993,379**

The funded debt includes \$300,000 Paducah & Elizabethtown 6s and \$300,000 first 6s; \$6,176,600 consolidated 6s; \$3,865,400 second consolidated 6s and \$561,000 equipment trust 6s. The bonds unsold included \$106,600 consolidated 6s and \$1,420,400 second 6s.

The earnings for the year were as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Earnings.	\$1,571,156	\$1,374,646	I. \$196,510	14.3
Expenses.	1,068,625	1,031,655	I. 33,930	3.3
Total	\$1,502,531	\$349,951	I. \$162,580	47.8
Net earnings.	.....	.....	.....	.....
Gross earn. per mile.	3,943	3,450	I. 493	14.3
Net " "	1,261	851	I. 410	47.8
Per cent. of expenses.	67.8	75.4	T. 7.6	.....

The report says: "During the year 133,566 new ties have been put in main track and 4,967 in sidings; 6,842 linear feet of timber trestling have been rebuilt and other improvements of the roadway have been made. Included in the operating expenses is the labor of laying 4,004 tons of steel rails and 11,627 cubic yards of stone and gravel ballast put in the track, \$18,025 for sleeping car mileage and expenses, \$18,951 for balances due other roads on interchange of cars, and \$9,356 for repairs on their cars, and the renewal of four passenger cars destroyed by fire in the earlier part of the year."

"As the freight equipment, acquired with the purchase of the properties now forming this company, was old and of 12 and 15 tons capacity, a considerable part of the labor of the mechanical department is required for their maintenance, and this has reflected on the maintenance of the remaining equipment, and a larger expenditure this year for this account will therefore be necessary in order to bring it up to the maximum standard of efficiency."

The receipts and disbursements from all sources were:

	1885.	1884.	Inc. or Dec.	P. c.
Net earnings of road.	.....	.....	.....	.....
Sale of 30 equipment trust bonds.	.....	.....	.....	.....
Increase in assets and supplies.	.....	.....	.....	.....
Decrease in sundry liabilities.	.....	.....	.....	.....
Increase in unpaid coupons.	.....	.....	.....	.....
Total	\$761,981	\$718,823	I. \$43,158	6.0
Expenses.	.....	.....	.....	.....
Rental, taxes, etc.	159,981	159,981	.....	.....
Interest on bonds.	474,940	5,000	.....	.....
Sinking fund.	.....	.....	.....	.....
Total	\$761,981	\$718,823	I. \$43,158	6.0

Net earnings of road \$502,531

Sale of 30 equipment trust bonds 30,000

Increase in assets and supplies 63,364

Decrease in sundry liabilities 23,156

Increase in unpaid coupons 235,440

Total **\$761,981**

Expenses **\$718,823**

Rental, taxes, etc. 131,358

Interest on bonds 200,121

Sinking fund 122,149

Interest on bonds 7,972

Rents, etc. 34,237

Rental, taxes, etc. 33,645

Rents, etc. 1,692

Rents, etc. 5,111

Rents, etc. 3,694

Rents, etc. 4.3

Total **\$761,981**

Expenses **\$718,823**

Rental, taxes, etc. 131,358

Interest on bonds 200,121

Sinking fund 122,149

Interest on bonds 7,972

Rents, etc. 34,237

Rents, etc. 33,645

Rents, etc. 1,692

Rents, etc. 5,111

Rents, etc. 3,694

Rents, etc. 4.3

Total **\$761,981**

Expenses **\$718,823**

Rental, taxes, etc. 131,358

Interest on bonds 200,121

Sinking fund 122,149

Interest on bonds 7,972

Rents, etc. 34,237

Rents, etc. 33,645

Rents, etc. 1,692

Rents, etc. 5,111

Rents, etc. 3,694

Rents, etc. 4.3

Total **\$761,981**

Expenses **\$718,823**

Rental, taxes, etc. 131,358

Interest on bonds 200,121

Sinking fund 122,149

Interest on bonds 7,972

Rents, etc. 34,237

Rents, etc. 33,645

Rents, etc. 1,692

Rents, etc. 5,111

Rents, etc. 3,694

Rents, etc. 4.3

Total **\$761**